ELECTRICAL REVIEW

27th JUNE, 1952

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Basic Organization

FOR his address as President of the British Electrical Power Convention Mr. P. V. Hunter chose as his theme the basic organization of industry. It is well that this subject should receive attention, for it might be inferred from the course of events during recent years that little or nothing is known about it in this country in spite of the examples of the coal mining industry, the railways and electricity supply.

In electricity supply, the policy of successive Governments for many years was to encourage public ownership by local authorities. When companies were granted Provisional Orders, there was always a clause whereby the local authority could take over after 21 years, 42 years, and so on. Later came the power companies and joint authorities, and many municipalities acquired rights outside their boundaries; and all this led eventually to the B.E.A. and the Area Boards. All these were instances in which an element of monopoly was unavoidable. Railway companies certainly competed over some main line routes, but it was rare for more than one electricity supplier to operate in one area—the city of London being, in this as in many other ways, exceptional.

When considering manufacture, it is apparent that haphazard development was even more marked. We have already pointed out that so far as requirements for generation, transmission and distribution were concerned, there was practically nothing in the nature of co-operative working until the second decade of this century. By that time it had become clear to those engaged in manufacture that if they were to have stability of employment, or research and development, or expansion to meet the growing world demand, the intensive price competition then universal must be regulated. Hence—again in a somewhat haphazard manner—small groups of manufacturers established minimum prices. It must be emphasized, however, that in general the prices were reasonable. No doubt the question "What is reasonable?" will

leap to the mind. A good answer is: prices acceptable between willing buyers and willing sellers. It has lately been asked whether this kind of action was in the public interest. The answer is in the affirmative, because the public consists of both sellers and buyers, and if buyers do not pay reasonable prices they cannot be surprised if the price is reflected in the quality. Perhaps it was inevitable that the increase in the number of lines sold at regulated prices should give rise to the opinion that the subject should be examined. There is, it may be admitted, a *prima facie* case for inquiry; but it is improbable that there will be sensational revelations.

CONVENTION PERIOD

All those in favour of a shorter Power Convention seem to have been absent from Bournemouth. At all events everybody with whom we discussed the subject was emphatic about the desirability of a longer period. This feeling was well represented at the annual general meeting when there was no dissent from the suggestion that next year's Convention (at Torquay in the second week of June) should be of the normal length. A breathless Convention is not at all satisfactory; there must be more time for "extra-mural" discussions which are more fruitful than conversations held amid the pressure of the official gatherings. The Convention Council should have little difficulty in coming to a decision in this matter.

I.E.E. IN IRELAND

Some two hundred members of the Institution of Electrical Engineers with their ladies were expected in Dublin this week for the Institution's summer meeting. It is the first visit of I.E.E. members as a body to Ireland since 1929 when they ate a memorable luncheon in the hydro-electric power house at Ardnacrusha, near Limerick, soon after the River Shannon was harnessed. This time they have seen turf-winning machinery in operation in the bog at Clonsast of Bord na Mona, a corporation formed in Ireland which produced nearly half a million tons of air-dried peat fuel last year, of which 20,000 tons was for electricity production. It aims to produce a million tons in 1954 and at the rate of two million tons a year by 1960 for power generation, industrial use and domestic consumption.

FOUNDRY IMPROVEMENTS

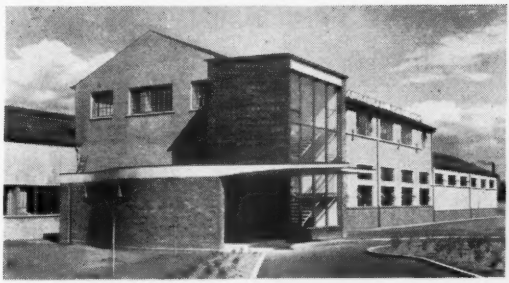
Progress in the grey ironfounding industry is reviewed in a long statement ("Servicing the Moulder") issued by the Anglo-American Council on Productivity. Although it is largely concerned with advances in productive methods made as a result of the visit of a team from the industry to the United States in 1950 it also deals with "independent" improvements made by ironfounders. It is strange that no direct reference to electrical methods is made in the survey but there are clear implications that a great deal of the machinery installed is electrically operated. It is said that handling is probably the sphere in which British industry has most to learn from the Americans. This report leads us to hope that similar ones will be forthcoming in due course from those sections of the electrical industry which sent teams to the United States.

PRESERVING WOOD

Overhead power line engineers are aware of several methods of preserving wood poles. News now comes from America of normal metal spraying to exclude moisture for delaying decay when in contact with the soil. The dense deposit, fine-textured, contains a small percentage of oxide. It is given a light coat of sealing lacquer, which should be wet sanded and rubbed smooth, then finally polished. Pine and other resinous woods can be similarly metallized, but tend to sweat at high temperatures.

Boiler Research

New Laboratories of Babcock & Wilcox, Ltd., at Renfrew



WE recently visited the new research laboratories of Babcock & Wilcox, Ltd., in High Street, Renfrew, about 1¼ miles from the company's main works. The main block is a two-storey building with a floor area of 22,000 sq ft and behind it is a combustion research building (5,000 sq ft). Further single-storey buildings with a total floor area of 22,000 sq ft will be built.

Many items of experimental work cannot be carried to a successful conclusion without full-scale testing to confirm results obtained in the laboratory. In this respect the department is fortunate in having three boilers at its disposal. One is a modified standard Babcock C.T.M. type (40,000 lb/hr at 1,500 lb/sq in and 850 deg F). It will shortly be fitted with new fans and feed pumps, capable of 100,000 lb/hr, to permit tests to be made at ratings considerably in advance of commercial practice.

Another boiler is a standard cross-type of 40,000 lb/hr rating at 450 lb/sq in and 550 deg F, fired by a standard Babcock-Detroit "Rotograte" spreader stoker. The third boiler was installed this year and is of the F.H. integral-furnace type (60,000 lb/hr at 450 lb/sq in and 550 deg F), fired with pulverized fuel. The last-named boiler has been specifically designed to facilitate experimental work with fuel mills; it has elaborate arrangements on the pulverizing side for either direct firing or the bin-and-feeder system, with arrangements for alternative fuel mills, the standard being a Babcock E type. All this boiler plant is situated in the works so that the large quantities of steam can be usefully employed.

Spectrographic analysis in the chemical section

Apart from general administration, the department, which employs 205 persons, is divided into six sections, each under the control of a section leader. The chemical section is responsible for quality control of all material entering the works, control of pickling procedure, corrosion and surface protection problems, and certain aspects of

Bank of six furnaces for scaling tests showing instrument panel and traversing balance

the behaviour of metals at high temperatures. Routine analysis alone involves the examination of some 10,000 specimens, which, with an average of four elements a sample and duplicate testing, means 80,000 determinations a year. Physical methods save much time in routine analysis; those we saw included spectrographic and colorimetric analysis, corrosion protection and investigations into the high temperature scaling of metals.

In the apparatus for scaling tests each specimen consists of a tubular section machined from a solid bar suspended in the centre of an electric furnace, flue gas being supplied by a gas burner, with provision for injecting other gases as required. The furnaces are arranged in two groups of six, each group having a travelling balance so that the specimens can be periodically weighed. The fullest provision is made for continuous measurement of the furnace temperatures and for indicating and recording the CO_2 content of the flue gases. The results can be extrapolated to about 100,000 hours' service basis.

The fuel testing section primarily examines fuels, ash, refractories and related materials, dealing as well with non-routine water and scale analysis. The accuracy required in fuel and other analyses is in many cases greater than those normally obtained by conventional methods and this section has developed many new techniques. It has always been very active in B.S.I. and other committees responsible for the formulation of methods of sampling and analysis, and it possesess a remarkable collection of records of specimens originating from associated companies all over the world.

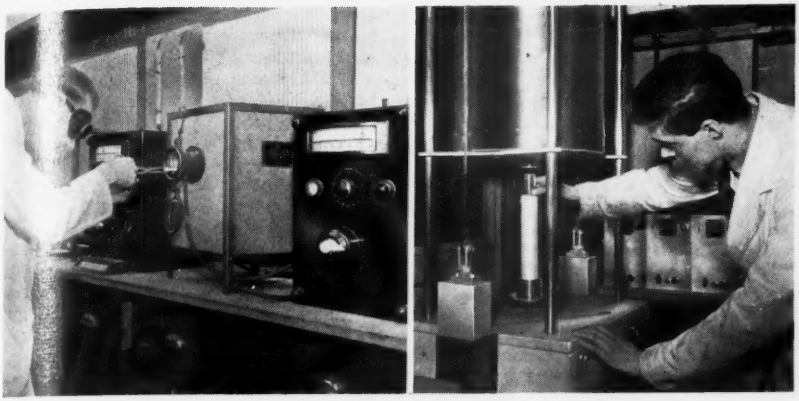
As a boiler efficiency test may be very costly a great deal of trouble is taken with coal sampling and special apparatus has been developed for this purpose, the calorific values subsequently being determined by conventional bomb-type calorimeters with one or two additional refinements.

The normal method of determining ash fusion temperature is by making a cone of finely powdered ash bonded with dextrine, and observing the temperature at which it sags and melts. Experiments are proceeding with cones much smaller than those laid down in the B.S. specification for this work. The miniature cones represent a considerable saving in the time required for fine-grinding the ash samples.

Slag-tap furnaces have stimulated interest in the viscosity of molten slags and equipment has recently been constructed for the study of this property in a furnace in which a specimen rotates in a platinum crucible. Measurement of the viscosity is made by the drag on a pivoted arm, at the end of which is a platinum cylinder which is immersed in the molten slag. A study has been made of the properties of slag deposits which form on the outside of boiler tubes. To assist in this work, a Newton Victor X-ray diffraction apparatus has been installed for the crystallographic examination and identification of these deposits.

Feed Water Analysis

The analysis of feed and boiler waters is another facet of the activities of the section. Routine tests of steam purity are made by electrical conductivity methods, but they must be calibrated and checked by complete analysis. The apparatus designed in the laboratory uses a platinum basin heated from the surface by a radiant heater, thus avoiding the boiling which might occur if it were heated from below. The whole unit is mounted in a dust-tight enclosure which is supplied with filtered air



Ash fusion furnace in the fuel section and (right) placing a sample in the slag viscosity apparatus

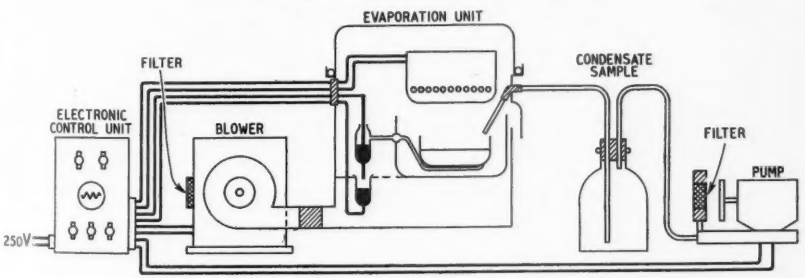
from a blower to accelerate evaporation. The evaporator vessel is mounted on a balance pan and when sufficient water has been driven off to allow the pan to rise, a contact is made which refills the pan from the main specimen container by displacement with air from a pump. Thyratron control gear supervises the refilling of the pan and when the specimen bottle is completely empty, shuts down the entire unit. This apparatus is capable of dealing with 5 litres of condensate in about 25 hours, operating entirely unattended.

Mechanical testing can be roughly classified as investigational work, which is allied to the research programme, and "routine" testing, which is concerned mainly with quality control of materials or customers' acceptance tests. Testing at elevated temperatures is an important part of this section's work; it is not always possible to get information from the steel-makers.

An interesting machine in the investigational laboratory is for rapidly determining the modulus of elasticity of small metal specimens by the electronic measurement of resonant frequencies. A rod of the metal under test is suspended horizontally from two glass-silk loops, one of which is attached to the diaphragm of a loudspeaker and the other to a gramophone pick-up. The loudspeaker diaphragm is made to vibrate over a range of frequencies and the rod begins to resonate when the appropriate frequency is reached. The resonance is detected by vibration of the gramophone pick-up, which gives a signal on a cathode-ray oscilloscope. From the determined frequency of resonance, Young's modulus can be readily calculated.

In the same department, samples of pipe and superheater tube material are

Schematic diagram of water evaporation apparatus



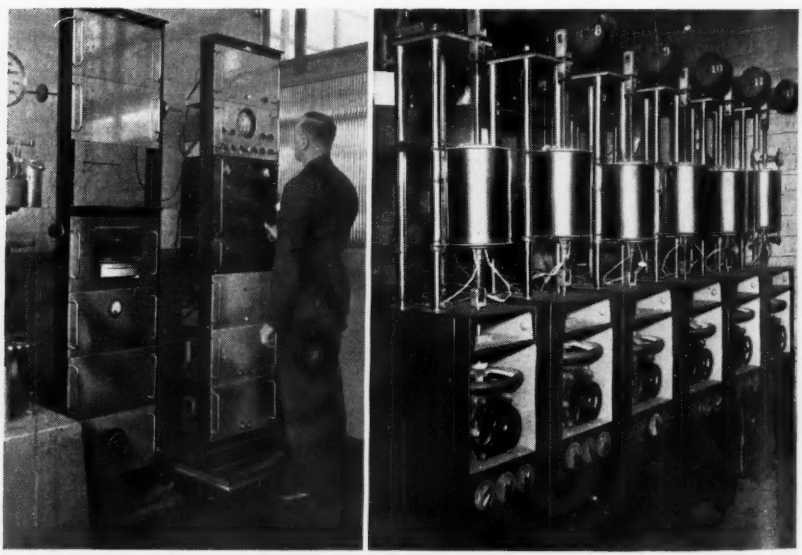
submitted to a range of tensile stresses at elevated temperature until failure occurs, a process which may take anything from a few hours to several thousand. The specimens are heated in electric furnaces thermostatically controlled to within 2 deg C. There are 72 of these testing units in continuous operation, in two equal groups. Steam rupture tests are also carried out on actual samples of superheater tubes. There are three machines, each capable of containing six specimens, which are fed with steam from an autoclave at pressures up to 2,000 lb/sq in and any temperature required, until they burst.

Very high superheating requires the use of austenitic (stainless) steels and considerable difficulty may be experienced in service with the joints between these steels and ferritic or carbon steels, due to their different coefficients of expansion. In the search for the most efficient method, more than 150 types of welded and mechanical joints have been investigated.

Thermal fatigue, involving rapid cycles of heating and cooling, is the chief method of investigation, with a modified tensile test rig, in which the specimen consists of two pieces of ferritic metal with a piece of austenitic material welded between them, so that there are two joints in series. An enclosed heating element surrounds the bar and is caused to slide up and down automatically so as to heat either of the two joints alternately. An air blast rapidly cools each joint as soon as the heating element moves away, giving rapid alternations of heating and cooling under tension, the tests being carried on until failure occurs.

Much of the work of the engineering research section is carried out in a large test bay at one end of the main building, which has crane facilities, and there is plenty of space to erect the largest pieces of apparatus. An important part of the work here is the experimental and analytical investigation of stress systems in welded pressure vessels. The stress systems existing in such parts as drumheads and welded nozzle connections are extremely complex, but it is only by a thorough understanding of the stress distribution that pressure parts can be really designed rather than made on a trial-and-error basis. Babcock & Wilcox can claim to be among the first in this country to apply electric strain gauges in the investigation of stresses in pressure parts, and a

Electronic equipment for determining Young's modulus of metal specimens and (right) bank of hot rupture testing machines



specific method has been developed which permits their application to the inside surfaces of vessels for water tests at up to 2,000 lb/sq in.

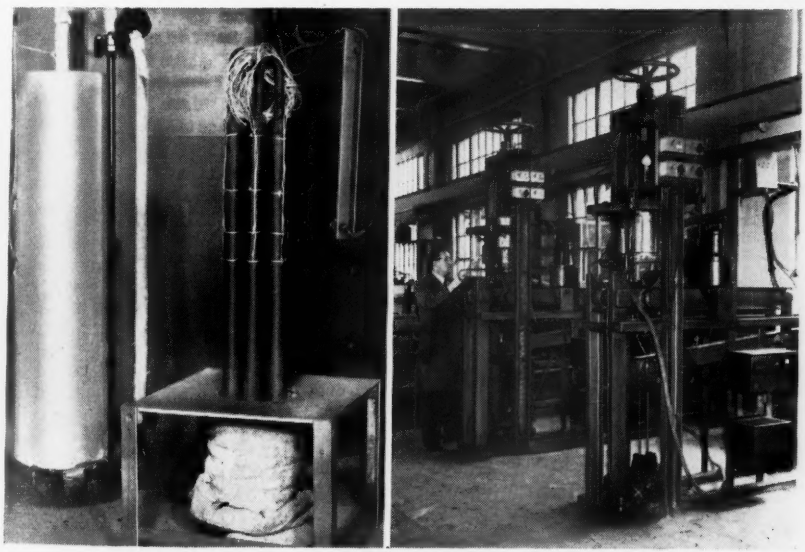
Welded drums and similar pressure parts operate under fatigue conditions during their working life. Fatigue testing to destruction is carried out on full-size experimental vessels by an equipment capable of subjecting them to a pressure of up to 2,000 lb/sq in six times a minute. High-speed Werner & Pfleiderer hydraulic fatigue equipment is also being installed capable of subjecting specimens to a hydraulic pressure of 4,500 lb/sq in 80 times a minute.

With the increase of pressures and capacities the amount of steam released per cubic foot of boiler drum has been increased markedly. This, coupled with the need for avoiding carry-over of solid salts in the steam, has necessitated close attention to the avoidance of turbulence in the drum and the complete separation of the steam from associated water droplets. It is also important to ensure that water entering the down-comer tubes from the drum does not carry with it bubbles of steam. Accordingly, a dummy boiler drum has been rigged with riser connections through which air and water can be pumped at velocities corresponding to those of the steam and water in an actual boiler and producing comparable turbulence. Inspection windows enable the behaviour of different steam separating devices to be studied.

Attached to the mechanical research section is a subsection specializing in the application of physical methods to engineering problems. In the electronics laboratory electronic controllers and similar apparatus are designed and constructed for the other sections of the department and for the works plant department. An important part of the work of this subsection has been investigation of means, other than X- or gamma-rays, for the detection of faults in welds, in particular the use of ultrasonics.

Commercial methods of ultrasonic testing give admirable results in the detection of faults of comparatively large area, such as slag inclusion, cracks, or laminations in steel plates; but they have limitations in, say, the critical examination of a welded joint, where any flaw would be quite minute. This has led to intensive development of ultrasonic test methods. One of the more interesting employs, in effect, a multi-crystal transmitter with a single

Steam rupture test for superheater tubes and (right) thermal fatigue testing machines



crystal receiver the other side of the test specimen. By rapid scanning of the multiple transmitters, after the manner of an elementary television raster, a pattern of spots is produced on the oscilloscope screen which shows up any flaws. This equipment is still in the experimental stage and has the limitation of requiring access to both sides of a specimen.

For such items as pipe butt joints which are accessible only from the outside, developments are taking place in the application of shear wave technique, a sharply-refracted wave being emitted at a shallow angle into the pipe and being reflected from the joint.

Problems arising from the operation of large boiler plant render a knowledge of the true gas temperatures in various parts of the boiler of great importance. The gases are not under black body conditions and are freely radiating to comparatively cool surfaces, so that normal thermocouple equipment cannot measure true gas temperature. High velocity suction pyrometers have been developed which are reliable for gas temperature measurement but, owing to the large size of boilers in use to-day, traverses of the gas passages cannot be made.

Work has been done on the sodium line reversal method in which an incandescent lamp beam is projected through the gas and the resultant light is examined spectroscopically. When the colour temperature of the lamp is below that of the gas the spectrum shows the characteristic bright yellow line emitted by the traces of sodium in the gas, which changes to a black line when the lamp temperature rises above that of the gas. It is comparatively simple to ascertain the temperature of the lamp filament at the point of reversal. One disadvantage of this method is that it cannot be used for temperatures below about 1,100 deg C. An investigation is being conducted into the use of the velocity of sound in the gases as a means of measuring the temperature. The experimental difficulties are great, but encouraging results have been obtained.

The activities of the combustion research section are mainly connected with the development of new combustion processes and the determination of the most suitable process for a given fuel. Research work is also done on problems arising from combustion, such as the causes and prevention of fouling, the corrosion of boiler heating surfaces and connected problems. Small-scale laboratory research is carried out in an independent laboratory, while, for pilot scale work, or small full-size projects, the combustion bay offers ample facilities. For large full-scale investigations the Renfrew boilers are available, the h.p. boiler being permanently operated as an integral part of the research department, either of the other two being available if required.

General view of engineering research bay showing tube expanding and flow tests on superheater sections

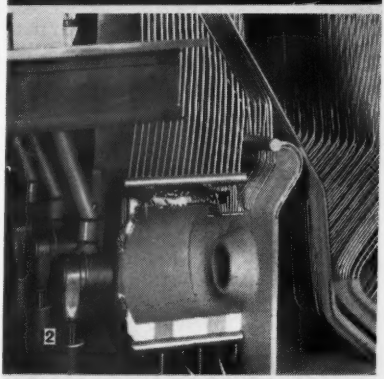
For pilot scale work on the "burnability" of a fuel, the standard method is the combustion pot, by which actual fuel bed conditions can be investigated. The 11in diameter pots stand on grates formed of actual gratebars and different types of pot furniture are made to simulate spreader or travelling-grate stoker conditions. Provision is made for continuously weighing the pot throughout the whole of the combustion process; thermocouples indicate the temperature at any depth of the fuel bed.

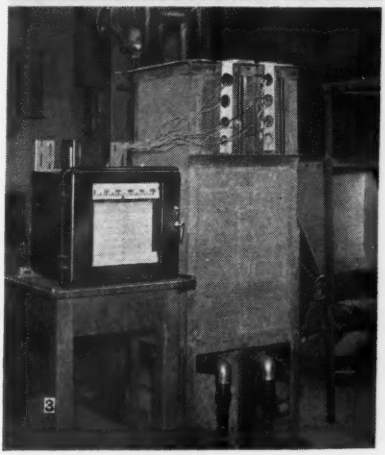
Work in progress on the burning of washery slurry on a small "Oldbury" stoker for shell boiler firing has by no means reached finality, but results obtained so far encourage the belief that this material can be added to the national fuel assets instead of, as at present, costing some 2s 6d a ton to throw away, in slurry ponds or dumps, where it is liable to cause further nuisance by being washed into rivers by rain.

Work on pressurized boilers and the various combinations of steam and gas turbine cycles is in two parts; small-scale tests are being made on unit combustion chambers using air supplied by a 460 h.p. compressor and a larger plant is in hand incorporating a Derwent III jet engine fired by a slagging cyclone combustion chamber designed to burn about a ton of coal an hour.

A new 60,000 lb/hr boiler fired by a slagging cyclone and incorporating certain novel features, which is being built in the boiler house adjacent to the high pressure boiler, is expected to be ready this year. It will enable cyclone combustion tests to be carried out on British and foreign coals and will provide valuable information about the behaviour of the cyclone and the associated boiler, over a wide range of conditions.

A considerable amount of work has also been done on determining the efficiency of various types of oil burner. Burners are usually tested in a combustion chamber, in conjunction with an infra-red gas analyser, but gravimetric methods of determining capacity and the wax-spray method of determining particle size distribution have also been used.





(1) Arrangement of strain gauges on boiler drums for stress analysis. (2) Sectional model of cyclone fitted to a radiant boiler. (3) Test rig for investigating the erosion of superheater tubes

VIEWS on the NEWS

By REFLECTOR

IT was quite clear at the Wednesday morning session of the Power Convention that the "Electrical Forum" was a popular innovation. As has been proved elsewhere, this is a good way of combining instruction with entertainment. There was a little light relief at Bournemouth but on the whole the instructional, or informational, side was predominant—which is just as it should be. I feel quite sure that this will be a regular feature of the next and future Conventions.

* * *

During the Convention a Bournemouth newspaper described Mr. C. T. Melling as chairman of the Eastern Gas Board—a slip which naturally caused some amusement and leg-pulling. Mr. Melling made several valuable contributions to the proceedings but it was most unfair and certainly quite wrong to associate him with our rivals (or "healthy competition") in this way.

* * *

Such confusion may have been pardonable in the case of Mr. Nimmo. When I recently found myself in Bognor I pulled up at the local showroom and thought that the proposed co-ordination had already started. In the windows were examples of gas and electric cookers, water heaters, refrigerators and even irons. Actually this is a relic of the past. The showrooms belonged to the Bognor Gas & Electricity Co. and they are now vested in the Area Gas Board. The Southern Electricity Board has a precarious foothold but will eventually have to move out, I am told.

* * *

The absurdity of the present position regarding purchase tax on refrigerators was brought home to me forcibly when I visited the showrooms of an electrical contractor recently. Side by side were two models, one a 7 cu ft domestic unit and the other a 15 cu ft commercial type. Thanks, however, to the 66⅔ per cent tax on the former, the difference in price was only about £26. The commercial model was just as attractive as the other and anyone who had the floor space (and about £160) would certainly pay the extra money to secure over double the storage space. After the apparent enlightenment and the rosy prospects of the immediate post-war period, the refrigerator does, alas, seem to be well and truly assigned to the luxury class and it will take a lot of effort to achieve a change of status.

* * *

Mr. B. R. Sankey, managing director of the International General Electric Co. of New York, Ltd., writes me as follows:—

"As three of us on the staff of this company are 'Doctors of Lumenology' we were very interested to read your comments in to-day's *Electrical Review* [20th June]. This degree can be obtained in three days but carries even more weight possibly than you appreciate. At the graduation ceremonies the successful student is given a diploma not only conferring the degree upon him but also licensing him to 'Park Posts, Twist Transformers and Loosen Lumens in any State of Unenlightenment.'

"Progress has apparently been made since I 'came down' from Schenectady 20 odd years ago because then it took a whole week to obtain similar distinction. These brief courses are remarkably effective in teaching the uninitiated something about the engineering of lighting and particularly to the engineer it is remarkable how much interesting information can be picked up in such a short and pleasant period."

* * *

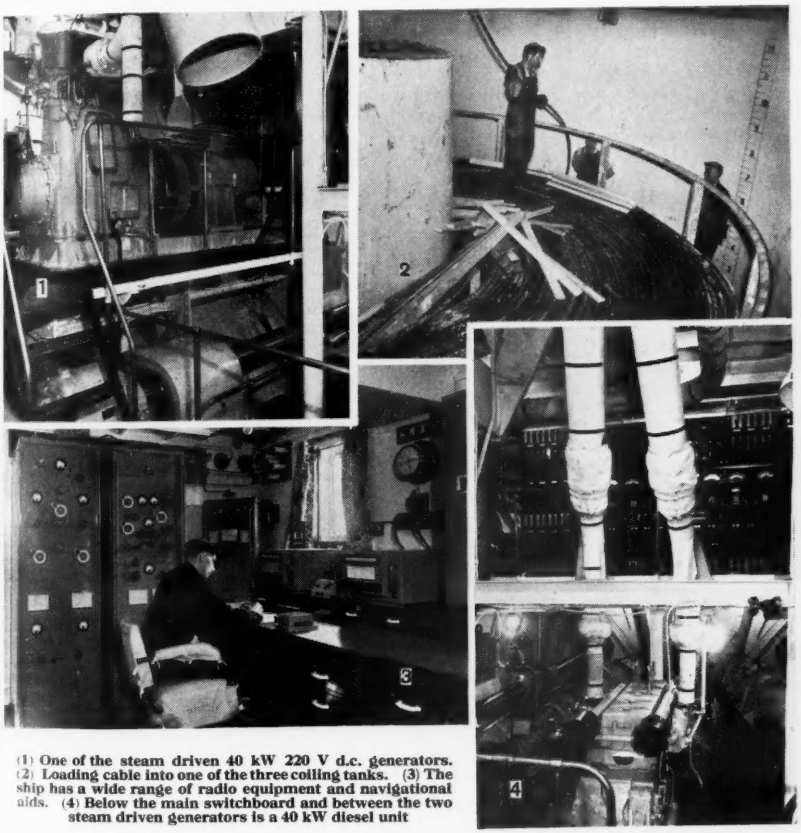
Many delegates returning from the Convention last week were pleased to meet on the road through the New Forest Mr. W. C. Kennett, M.I.E.E., and his dog. Mr. Kennett was on a walking holiday, making his way towards Lyme Regis—a 160-mile tramp from London.

C.S. "Stanley Angwin"

Latest Cable Ship Placed in Service

LAST week we had the pleasure of inspecting the 2,500 tons c.s. *Stanley Angwin*, the latest addition to the fleet of eight cable ships owned by Cable & Wireless, Ltd., while she was loading some 170 miles of submarine cable at the Greenwich works of the Telegraph Construction and Maintenance Co., Ltd. Built by Swan, Hunter and Wigham Richardson, Ltd., the vessel will have an operationa range of 10,000 miles, a coiling capacity of 18,000 cu ft, equivalent to 400 miles of deep sea cable, and a speed of 11 knots.

The ship will leave the Thames for Plymouth at the end of this month to begin her maiden voyage to her base at Singapore. Her operational area will stretch from Colombo to the Pacific Ocean and she will



(1) One of the steam driven 40 kW 220 V d.c. generators. (2) Loading cable into one of the three coiling tanks. (3) The ship has a wide range of radio equipment and navigational aids. (4) Below the main switchboard and between the two steam driven generators is a 40 kW diesel unit

maintain a 20,000 mile section of the Cable & Wireless 155,000 mile submarine cable system.

The c.s. *Stanley Angwin* is a sister ship of the c.s. *Edward Wilshaw*, built at the Neptune works of Swan, Hunter and Wigham Richardson, Ltd., in 1948, but incorporates various improvements. For example, the number of main boilers has been reduced thereby resulting in a more effective layout in the machinery spaces.

The ship is designed to carry a dead-weight of about 2,200 tons on a draught not exceeding 19ft, and is provided with three cable coiling tanks and a clipper stem carrying three cable sheaves.

Two independent cable gears are fitted abreast on the main deck forward which work on full boiler pressure and are equipped with direct acting wood and water cooled steel band brakes. These have been supplied, together with the dynamometer and electric turning-over gear for cable transfer, by Johnson & Phillips, Ltd. The windlass engine is fitted in a separate compartment on the main deck having cable lifters on the upper deck worked by vertical shafting from the engine below. A capstan head is fitted on the centre line on the upper deck forward and warping capstans port and starboard at the after end, and a combined steam and hand steering gear on the main deck aft.

Ventilation and Heating

Accommodation is provided on the bridge deck for the captain and senior officers, the ship's officers and engineers being on the upper deck. A dining saloon and separate lounge, also an engineers' duty mess, are provided. The petty officers and crew, with their respective messes, are berthed on the main deck and upper deck aft. Mechanical ventilation and heating on the single trunk system is arranged throughout all accommodation.

The cable testing apparatus which is all calibrated in B.A. units is the same as that in general use in the testing rooms of the company's other cable ships and has been supplied by H. W. Sullivan, Ltd., Muirhead & Co., Ltd., and Gambrell Bros. & Co., Ltd.

The ship has a wide range of navigational aids, the radar and deep sea echo sounding equipment being by Kelvin & Hughes (Marine), Ltd. The Marconi International Marine Communication Co., Ltd., supplied the visagraph echometer. There is also a comprehensive radio installation which has been supplied by the Marconi International Marine Communication Co., Ltd.

The vessel is propelled by twin screws directly driven by triple expansion engines taking steam at 220 lb/sq in from two single-ended oil-fired Scotch boilers. The electrical installation has been carried out by Campbell & Isherwood, Ltd., Newcastle-upon-Tyne, and includes three 40 kW 220 V d.c. generators, two of which are Belliss & Morcom steam driven units while the other is driven by a diesel engine supplied by the National Gas and Oil Engine Co., Ltd. The main and sub-cables in the machinery spaces, galleys and holds were supplied by Pyrotenax, Ltd.

International Electrical Specifications

WE have from time to time published information regarding specifications for electrical equipment issued by the International Electrotechnical Commission (I.E.C.) and by the International Commission on Rules for the Approval of Electrical Equipment (C.E.E.).

The main difference between the I.E.C. and the C.E.E. specifications is that the I.E.C. specifications are models for use by the various countries in preparing their own Standards which are intended to form the basis of contract between manufacturers and purchasers, while the C.E.E. specifications are model safety specifications which prescribe the tests to be carried out by those authorities who "approve" electrical equipment from the point of view of the safety of the public.

Full information regarding the aims and structure of the C.E.E. is contained in a booklet (C.E.E. publication No. 8) which has recently become available from the B.S.I., price 2s 9d (3s post free).

The C.E.E. has also recently issued a specification for plugs and socket-outlets for domestic and similar purposes. This specification (C.E.E. publication No. 7, price 8s 6d or 8s 9d post free) is a comprehensive document giving the dimensions of various types of plugs and socket-outlets in use in continental countries. It also describes the tests to be applied and the gauges to be used.

These C.E.E. publications, together with other C.E.E. and I.E.C. specifications, are obtainable from the British Standards Institution, 24, Victoria Street, London, S.W.1.

Flats for the Blind

Special Electrical Facilities at Swail House, Epsom

Swail House, Epsom, showing part of the old building and the east wing

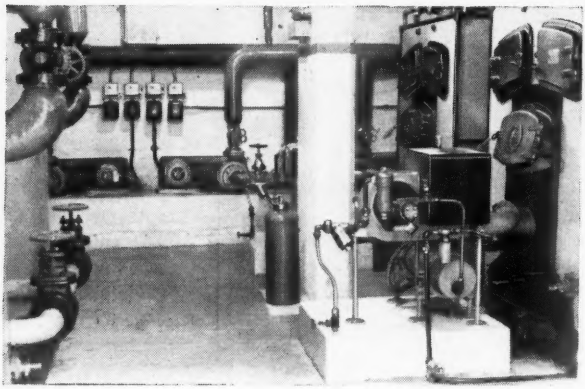
BELIEVED to be the first in the world for registered blind persons, the flats which the London Association for the Blind (a voluntary organization) has provided on the Swail House Estate, Epsom, are of particular interest electrically on account of the necessarily special arrangements which have had to be made for the occupiers. The property comprises fifty-five flats, twenty-nine single and twenty-six double, providing accommodation for eighty-one persons. Eight of the single flats are in the original house, and two double flats in a cottage in the grounds, the remaining forty-five being situated in a new three-storey building.

Each new flat has a kitchenette provided with a "Baby Belling" cooker (now in course of being fitted with special Braille dials) but the wiring is of sufficient capacity to take a full-sized cooker if it is required. A socket outlet is conveniently situated for the use of a kettle (a "Swan Brand" model is supplied), iron and other appliances. For those who do not wish to cook their own meals lunches are provided on four or five days a week in a dining and social room used extensively for concerts, plays, gramophone recitals, handicraft classes, etc. The kitchen attached to this room is equipped with a 4 kW Jackson hotcupboard, a Hobart potato peeler and a "Coldrator" refrigerator.

In a laundry and drying room, which is available for use of the occupants on a rota system, provision is made for installing a washing machine should it be decided that this can safely be operated by a sightless person. A surgery, which a doctor attends regularly once a week, is furnished with a Hanovia ultra-violet lamp and sterilizing equipment.

Great attention has been paid to the lighting throughout the establishment, even in flats occupied exclusively by blind people (only one of a married couple need be blind to be eligible for a flat). This may be rather unexpected, although it will be understood when it is explained that the definition of a blind person includes one

Each flat is provided with an electric cooker



The boiler house is electrically controlled throughout

with a limited amount of sight as well as the totally blind.

Generous provision for lights has been made not only in the flats but the corridors, entrance hall and staircases where the Falk Stadelmann totally enclosed hemispherical fittings are controlled by Columbus vacuum switches giving a three-minute time delay. In the dining and social room tungsten lighting from six attractive peach semi-direct ceiling fittings (Merchant Adventurers, Ltd.) and four wall brackets to match is supplemented by "Ionlite" cold-cathode fluorescent lighting from tubes fitted in the jack roof behind glass ceiling panels. Colour-blended fluorescent lighting is also employed in the central kitchen. "Lacent" prismatic fittings (Heyes & Co., Ltd.) are provided along the whole length of the access balconies for external illumination of the building.

Central heating and constant hot water are provided by two "Britannia" oil fired boilers fitted with "Electromatic" oil burners, the latter being operated by Hoover $\frac{1}{6}$ h.p. motors with "Memette" starters. A Drayton switch controls the water supply to the boilers. The two pairs of Holden & Brooke pumps for the central heating and hot water systems are driven by English Electric 1 h.p. 1,400 r.p.m. motors with E.A.C. starters and "Radette" switch-fuses, all four units being covered by a G.E.C. 4-way 20 A triple-pole distribution board. A sump pump is also provided. "Memrex Senior" switch-fuses are employed for the boiler house power supplies and Prentice units for the landlords' lighting. Metering is done by an Aron polyphase instrument.

In addition to the central heating, tenants are permitted to use electric fires provided they are of an approved safe type. Every flat is fitted with an alarm switch (Gent & Co., Ltd.), connected, through a 57-way indicator and relay system, to a centrally situated indicator board and bells in the flats occupied by the warden (Mr. D. McGregor) and assistant warden (whoever is on duty) and to an outside bell for use when necessary during the daytime.

Rising mains are used to feed groups of three flats, the six-way Revo consumer's service unit and the Aron shilling prepayment meters being situated in easily accessible cupboards in the kitchens. The landlords' lighting for the corridors and outside the building is controlled by a Venner time switch with an over-riding "Auto-Memota" push-button switch. Simplex main switch and fusegear are employed. All the cables were supplied by W. T. Henley's Telegraph Works Co., Ltd.

The complete electrical installation was carried out by Buchanan & Curwen, Ltd., 66, Victoria Street, London, S.W.1, the contract being handled by their Leatherhead (Surrey) branch, under the direction of Mr. J. B. F. Couper, F.R.I.B.A., the architect for the London Association for the Blind.

Shortage of Electricians

A SHORTAGE of electricians at shipyards on the North-East Coast is reported. Mr. W. Scott, area secretary of the Electrical Trades Union, has received an inquiry from one yard alone for 100 men and the Ministry of Labour has had applications for a similar number. It is believed that work could be found for at least 300 electricians and firms are making inquiries in other areas, notably in the South of England, to see if any are available. Recently one firm obtained 150 from outside areas.

SUPPLY IN MALAYA

Annual Report of the Central Electricity Board

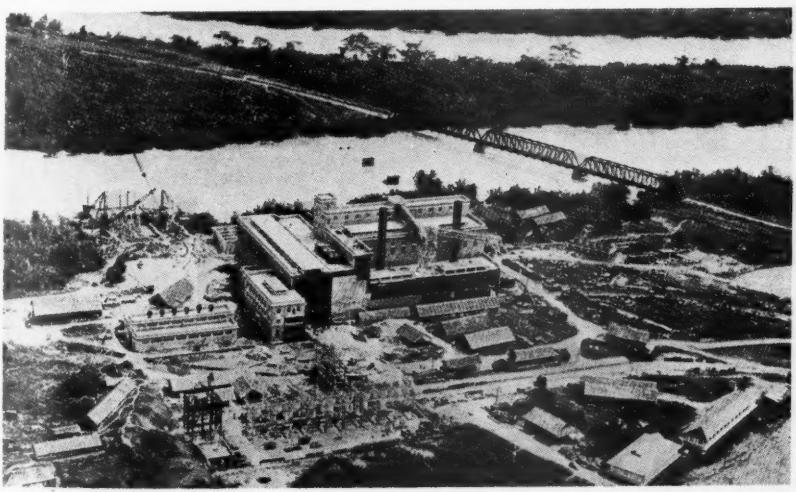
ANOTHER period of continuous effort to meet a constantly increasing demand for electricity all over the Federation of Malaya, with insufficient plant and equipment and depleted staff, is recorded by the report covering the second year of operation of the Central Electricity Board. Considerable ingenuity has been displayed by the Board's staff to secure the maximum restriction of demand over the daily peak load periods with the minimum of inconvenience to consumers, and it is hoped that these difficult conditions will be eased towards the end of 1952 when additional generating plant is in operation.

Despite restrictions, sales of electricity during the year ended 31st August, 1951, increased by approximately 18 million kWh to 160 million kWh and the revenue by $2,604,157 to $16,243,690. Heavy increases in the price of fuel and in the cost of salaries and wages made it necessary to revise electricity tariffs during the year. After meeting all charges on revenue account and making provision for renewals and pensions, the Board again earned a dividend of 4 per cent on its capital of $30 million.

Satisfactory progress was made during the year with the construction of the Connaught Bridge power station and it is anticipated that the first part of this new station (40 MW) will be in commercial operation by the beginning of 1953. The Board's existing generating plant comprises the Bungsar steam station (26·5 MW), the Ulu Langat Upper and Lower hydro-electric stations (2,288 kW) and 32 diesel stations. Energy is also purchased in bulk from licensed undertakings at seven stations. During the year the number of consumers increased from 50,006 to 54,462.

In the period under review the fuel position in the Federation deteriorated and it became necessary to convert the last coal burning boiler at Bungsar power station to oil firing. No local coal will be available

Aerial view of Connaught Bridge power station from west, showing 66 kV substation in foreground, workshops to left of main building, intake monolith on river bank behind workshops and Connaught Bridge top right



for the Connaught Bridge power station when it is commissioned towards the end of this year and it will be necessary to use imported coal. It is also apparent that there is little prospect of additional supplies of local coal becoming available for power stations in the Federation and it is therefore of the first importance that steps should be taken to develop the national hydro-electric resources as soon as possible. The Board is at present actively engaged on exploring ways and means to obtain loan funds to finance the Cameron Highlands hydro-electric scheme and grid. This scheme is estimated to cost $150 million and will have an output of 670 million kWh a year at an all-in cost of 1¼ cents per kWh generated.

Research Reports

Recent Publications of the E.R.A.

AMONG the publications which have recently been made available by the British Electrical and Allied Industries Research Association, Thorncroft Manor, Dorking Road, Leatherhead, Surrey, Report Ref. L/T258, "Field Dependence of the Dielectric Constant," by J. J. O'Dwyer (6s) gives an account of work which has been carried out at Liverpool University. It is shown that a very general calculation can be made giving the dielectric constant of a material in terms of the spontaneous fluctuations of the electric moment of the material which would occur in a field-free region. It is the purpose of the present calculation to extend the work done by Fröhlich one step further, thus including the first term in the field dependence of the dielectric constant. In order to preserve continuity of argument it has been found necessary to reproduce a great deal of Fröhlich's work.

Report Ref. Z/T82, "The A.C. Argonarc Process for Welding Aluminium: An Oscillographic Analysis of Effects of Welding Transformer Open Circuit Voltage on Arc Re-ignition," by L. H. Orton, Ph.D., F.Inst.P., and J. C. Needham, B.Sc. (Eng.), (5s) is the second of a series on the subject, the first being Ref. Z/T80. The arc has here been examined using oscillographic techniques with time resolutions down to μsec and the considerable differences in both the arcing and re-ignition characteristics between the straight and reverse polarity half cycles have been analysed. The arc re-ignition process for the reverse polarity half-cycle is shown to be complex, and, in general, there is a series of "ignition oscillations," each cycle of which lasts some 10 μsec and is repeated from 10 to 50 times, before the arc is finally established in the half-cycle.

Voltages have been established for maintaining the arc both with and without h.f. spark injection, with and without a large series capacitor, on commercially pure aluminium and on aluminium 5 per cent magnesium alloy. It is shown that the spark injector permits a drop of about 60 V in open circuit voltage from that required for a self-maintaining arc, and the addition of a series capacitor, about 15 V reduction. The marked effects of surface condition and material of the work plate on the required voltage have also been demonstrated. The data provide a probable explanation of the apparent discrepancy in the open circuit voltages extant in literature.

Under optimum conditions the argonarc was successfully maintained on an Al–5 per cent Mg plate at an open circuit voltage as low as 45 V r.m.s.

Report Ref. N/T61, "Stainless Steel Magnetic Recording Wire," by Prof. W. Sucksmith, F.R.S. (6s) is a report of an investigation into the magnetic properties of stainless steel recording wire in the light of the theories of Stoner and Wohlfarth on the one hand and Néel on the other, on the shape anistropy mechanism of hysteresis in heterogeneous magnetic alloys. The variation of coercive force and J_{REM}/J_{SAT} with time of heat treatment at 450 deg C, 500 deg C and 550 deg C were required.

A knowledge of the physical mechanism by which the heat generated inside a transformer tank is dissipated is necessary if the designer is to keep hot spot temperatures as low as possible. Report Ref. Q/T117, "Temperature Gradients in Transformer Windings and Rates of Oil Flow in Transformer Tanks," by B. L. Coleman, B.Sc. (6s) reviews the attempts which have been made to deal with this problem theoretically and empirically, for transformers of the natural oil cooled type having concentric windings.

The heating effects of the sun or the cooling effects of wind, rain, etc., are of growing importance as loads approaching the permissible maximum are placed upon transformers. Report Ref. Q/T118, "The Operation of Naturally Cooled Outdoor Transformers as Affected by Weather and Surroundings," which is a preliminary review by M. R. Dickson, B.Sc. (Eng.) (18s), has been made as a basis for any further investigation of this subject. Use is made of calculations for three specimen transformers to obtain rough numerical information as to these effects.

Electro-Mechanical Interval Timer

Simple Apparatus Based on a Uniselector

By L. N. PATCHETT, Ph.D., A.M.I.E.E., M.I.R.E., A.M.Brit.I.R.E.*

THE device to be described was originally developed for a laboratory experiment in the determination of the operating time of protective relays. With some modification it can also be used to close a circuit for a predetermined time. It is developed around a uniselector or impulse relay and, as built by the author, will time up to 104 sec but can be modified for any maximum time. The timer moves in steps of 0·02 sec and can therefore be read to this accuracy. The absolute accuracy is dependent on the mains supply frequency which does not change by more than ± 4 per cent and for most of the time is considerably nearer 50 c/s. A correction can easily be made if the frequency is known.

The timer is based on the idea of operating a uniselector or impulse relay from an a.c. supply through a half-wave rectifier. A uniselector or impulse relay consists of an armature operated by a solenoid which is arranged to rotate a contact (or contacts) by means of a ratchet wheel. A uniselector usually has a ratchet with 50 teeth requiring 50 impulses for a complete revolution and may have up to eight moving contacts or wipers, which move over banks of 25 fixed contacts. The impulse relay (which is readily available from ex-government stores) is similar in principle but has 104 teeth and drives a four-position wafer type switch and also an auxiliary contact which opens in four positions of the spindle. If the coil of either of these devices is fed directly from a half-wave rectifier (not through the make and break contacts) the coil receives a pulse of current every cycle and the ratchet operates at 50 times per second. In the case of the uniselector it therefore rotates at 1 r.p.s., while the impulse relay rotates at 1 revolution in just over two sec. As the relays move in steps there is no overshoot when the circuit is broken, the relays coming to rest in less than 0·02 sec.

In the apparatus described a uniselector is driven in this way so that by fitting a pointer to the moving part, the pointer rotates once per revolution and the scale may be marked off in 0·02 sec intervals. An impulse relay is inconvenient for this purpose due to the odd number (104) of teeth on the ratchet. The uniselector is arranged so that a contact is made every revolution and this is arranged to step on an impulse relay (or another uniselector if desired) one tooth per sec. One revolution of the impulse relay then corresponds to 104 sec and a suitable scale can be constructed. The timer, therefore, reads up to 104 sec in intervals of 0·02 sec. Longer times may be obtained by counting the revolutions of the impulse relay or by

* Bradford Technical College.

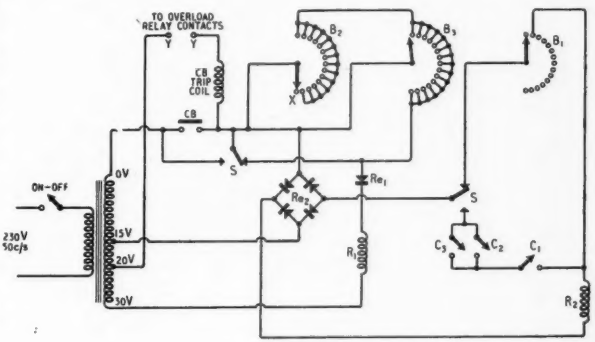


Fig. 1.—Complete circuit of electro-mechanical interval timer with range of 104 sec in steps of 0·02 sec

adding another impulse relay operated by the second.

The circuit to the timer and to the relay or other device on test is completed (Fig. 1) through a small circuit breaker CB (with two pairs of contacts), which is tripped by the overload relay or other apparatus being timed. On closing the circuit breaker a circuit is completed through the normally closed contacts of S, rectifier Re1 and uniselector driving coil R1. The uniselector, therefore, continues to rotate until the circuit breaker is tripped, by closing of the overload relay contacts. Once per revolution a circuit is completed through the full-wave rectifier Re2, the closed contacts of switch S, the single contact of the uniselector bank B1 and the driving coil R2 of the impulse relay.

Normally the wipers of uniselector relays are double ended so that contact is made twice per revolution and one of these contacts must be removed or bent so that it does not make contact. In this way contact is only made once per revolution, on a contact corresponding to 49/50th sec on the uniselector scale. One advantage of these relays is the ease with which they can be returned to zero. The relays are reset by the switch S. This completes the circuit of the uniselector coil R1 through two contact banks B2 and B3.

All the contacts of the banks are connected together except one (shown at X). Thus the relay will run round until the wiper of B2 comes opposite contact X, the wipers being shown in the zero position. The unwanted halves of the wipers must be removed as shown in the diagram. Closing switch S also completes the circuit for the impulse relay R2 through its make and break contacts C1 (which must be used since the coil is fed with d.c. from a full-wave rectifier) and two contacts C2 and C3. C2 is a contact on the wafer switch and C3 the auxiliary switch. The relay will therefore rotate until both these contacts are open, corresponding to the zero position. If a uniselector is used in place of the impulse relay C2 and C3 would be replaced by two contact banks wired as B2 and B3. The time for resetting is about 2 sec maximum.

The device may be modified so that the circuit is closed for a given time (instead of determining the time for which it is closed) by using two uniselectors and wiring two banks of each as shown in Fig. 2. By making connections to suitable contacts on the banks (e.g., by using two 50-position selector switches) any time may be obtained up to 50 sec in 0·02 sec steps, since the trip circuit will only be completed when both uniselectors are in the appropriate positions. As the time of contact is only short the circuit breaker must be designed to operate with a brief current pulse in the tripping coil.

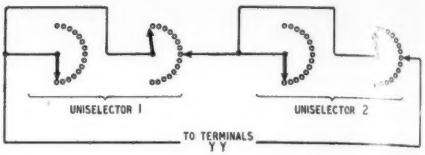


Fig. 2.—In this way the circuit can be closed for a given time, instead of determining the time for which it is closed

Although the device described was designed for the specific purpose of timing overload relays the apparatus may easily be modified to suit other requirements. The apparatus is simple, not expensive and constructed with components that are readily available.

H.F. Glossary

THE increasing employment of high frequency electric heating for a variety of industrial purposes has brought into use fresh terms, some of which are being loosely applied. To assist in the clarification of their meanings a glossary of technical terms has been compiled by that section of the B.E.A.M.A. which is concerned with equipment of this kind.

British Standard definitions have been used, or reference made to them, whenever possible in the glossary. In some cases, however, the terms employed industrially have different meanings to those of the B.S. so that some new definitions have had to be made. For example, the several sources of i.h.f. power have, by common usage, been grouped together as "generators" although B.S.205 defines only the alternator itself as a generator. Thus, in Section 1 of the glossary alternator, invertor, spark-gap and valve-driven equipment are all included as generators. Section 2 defines induction and dielectric applications, while Section 3 contains general terms and Section 4 is an alphabetical index. Alternatives to the 87 terms listed are shown in brackets as acceptable, but less favoured, equivalents. This B.E.A.M.A. publication No. 147 (1952) is obtainable from 36, Kingsway, London, W.C.2, price 2s net.

Royal Counties Show

Wide Applications of Electricity Demonstrated

ELECTRICITY figured prominently at the Royal Counties Show, held last week at Guildford for the first time since 1932. In the centre of the showground the South Eastern Electricity Board arranged an attractive display of agricultural, horticultural and domestic appliances. The display was divided into fourteen sections, each devoted to one class of equipment.

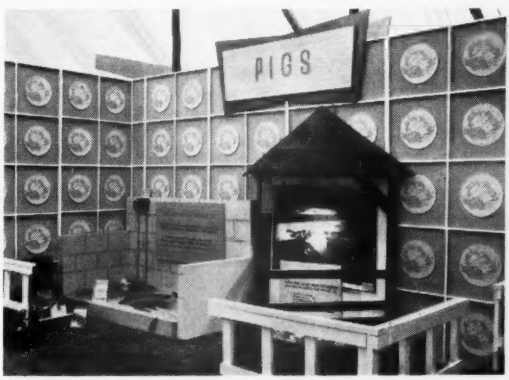
Particular prominence was given to a full-scale working model of a platform grain dryer of a type which is becoming increasingly popular in the area with the small farmer, and also a full-scale section for demonstrating the pre-heating of tomato beds. There were also light irradiation, propagating, and soil sterilizing sections. Poultry appliances included the Curfew visible "Perspex" incubators, a Woolley electrically heated drinking trough, a Cope & Cope egg washer, and Weston & Macmaster incubators and brooders.

In the farm food section various types of food steamers and boilers were displayed. All the barn machinery was demonstrated, from grinders to sack hoists and corn conveyors. Both infra-red bed heating and floor warming for pig rearing were to be seen, though unfortunately foot and mouth disease restrictions prevented the showing of live piglets as originally intended. For the dairy farmer there was a large range of dairy and water heating equipment with particular emphasis on the heat storage type. In addition there was a Purlac chilled water in-churn cooler, which incidentally can readily be converted for a surface cooler, also a Nash & Thompson cooler.

To call the visitors' attention to pumps an attractive setting was arranged with a waterfall and floral surround and nearby was a demonstration of hedge cutting. Departing from the more usual workshop atmosphere there was a display of the electric tools for repairs to farm machinery, etc. The domestic stand contained a comprehensive display of electric cookers, refrigerators, water heater and small appliances. The whole of the display was designed and constructed by the Seeboard staff.

An extremely comprehensive display of electrical equipment was also arranged by the Surrey Area Branch of the Electrical Contractors' Association. Covering commercial and decorative lighting fittings; farm appliances; space, soil and water heating equipment; generating plant; radio and television; wiring systems; cooking and other domestic appliances, it included G.E.C., English Electric, "Goblin," B.I.-Callender's, Bill, "Mazda," Dimplex, Belling, Berry, "Sadia," Black and Decker, Thermovent, Smiths English Clocks, H.M.V., Cooper-Stewart, Falk Stadelmann, "Creda," Pye, Philips, Benjamin and Unity products.

Among the exhibits of individual manufacturers interest was centred mainly on sterilizing, milk cooling and refrigeration. Comprehensive displays of all types of apparatus were shown by Perkins Clean Milk Equipment, Ltd., and Gascoigne's



A section of the Seeboard display illustrating electrical applications in the rearing of pigs

(Reading), Ltd., and among the many exhibitors of refrigeration plant, which included farm freezers, chilling rooms and display counters, were Seldon & Co. (Guildford), Ltd., Elton Industrial Distributors, Ltd. (" Sternette " equipment), the Windsor Refrigerator Co., Ltd., Hampshire Refrigeration, Ltd. (including a " Prestcold " mobile showroom), Refrigeration A-Z (Guildford), Ltd., the Modern Electric Co. (" Coldrator "), and Central Distributors (Southern), Ltd. (Frigidaire). In addition to " Electrobloc " steam raising and water heating equipment, T. W. Woolley & Co. (Southern), Ltd., showed potato steamers and a new in-sack grain dryer. Morrison automatic generating plants were demonstrated by Lionel G. Gallwey, Ltd., while the Hoover mobile demonstration unit was used to exhibit fractional h.p. motors, cleaners, polishers and washing machines.

OFFICE LIGHTING

Ministry of Works Report

GUIDANCE with recommendations about the lighting of office buildings is given in Post-War Building Studies No. 30, which has been published for the Ministry of Works by the Stationery Office, price 3s 6d. This report has been compiled by the Lighting Committee of the Building Research Board of the D.S.I.R.

Natural lighting is first dealt with, minimum values both of natural and artificial illumination being specified for different kinds of office work and different parts of the building. Members of office staffs strongly dislike working wholly in artificial light and when they must unavoidably do so there is a general preference for fluorescent lighting, which is discussed in an appendix.

In the section on artificial lighting account is taken of " discomfort glare " as well as " disability glare " due to extreme contrasts between the visual task and the surroundings. Recommendations made for easing the strain on office workers include avoidance of sharp local changes of brightness, such as from a dark desk top or from dark wall colours; the positioning of light sources for the better distribution of downward and sideways lighting; and the use of furniture of light colours and skilful decoration. An appendix is devoted to the analysis of various visual office tasks by the use, as comparative measures, of size of detail and contrast with the immediate background.

Wiring and service piping installations are mentioned only briefly because guidance about them has already been given in Post-War Building Study No. 11. The present report, however, records its preference for a complete installation for lighting a whole floor, instead of leaving tenants to install wiring to their own individual requirements from a rising conductor main.

In a section on ways and means, mostly expedience, of improving the daylighting of existing buildings, the most advantageous course is said to be the use of artificial light to supplement inadequate daylight. When supplementary artificial light is acceptable for daylight use in this way it is important to consider how it affects the depth of the zone which may be made to appear well daylighted. Evidence varies, but if the directly daylighted zone is about 10ft wide the report says that at least another 10ft could be made to seem well lit and experience may prove that this figure can be increased.

This report supports previous recommendations that relevant parts of the Factories Act, 1932, and of the Shops Act, 1924, should also apply to offices in order to ensure that " suitable and sufficient " lighting would be provided in office buildings.

Substation Fatality

A SWITCHBOARD operator, Denis Adrian Farrell (30), of Hoylake, was fatally injured at the Carr Lane substation, Hoylake, on 12th June. At the inquest, when a verdict of " Accidental death " was recorded, Mr. J. E. Foster, the engineer in charge of the substation, said that Farrell had charge of the keys but had no authority to enter the cubicle. He did not know why he had done so.

CORRESPONDENCE

Letters should bear the writers' names and addresses, not necessarily for publication. Responsibility cannot be accepted for the opinions expressed by correspondents.

Socket Outlets

THE very interesting article by Mr. Arthur Cunnington in your issue of 13th June will be welcomed by everyone who realizes the need for an adequate provision of socket outlets on all domestic premises.

As he has pointed out, many people are discouraged and debarred from using modern electrical appliances simply because they have no convenient sockets to which the appliances can be safely connected.

Mr. Cunnington is not on such sure ground, however, when he suggests that contractors are responsible for this lamentable state of affairs. Contractors were foremost in advocating the 13 A domestic socket, but they have very few opportunities of deciding when it shall be used.

Apart from the Ministry of Works, L.C.C. and a few other housing authorities, the 13 A socket is not being generally specified, apparently because architects, builders and others, who are entrusted with the task of preparing electrical specifications, have never heard of it: their knowledge of electrical accessories seems to be limited to what they have seen displayed on the counters of chain stores.

Mr. Cunnington does some injustice to his case for the 13 A socket when he suggests that an adequate number of these would cost more to install than a limited number of the old type. This is not so: the cost of installing the twenty 13 A sockets in the dwelling illustrated in his article would be no greater than the cost of installing only one 15 A socket in each room.

Towards the end of his article Mr. Cunnington appears to lose faith in the 13 A socket and he suggests using 5 A and 15 A types and that the I.E.E. Wiring Regulations should be amended to permit them.

Apart from the time it would take to get the Regulations altered (if indeed they could be satisfactorily altered) there seems to be no point in this suggestion because the 13 A socket was designed to solve this very problem; it is being produced by all leading manufacturers, and I therefore suggest an amended future slogan "We want the 13 A socket, and nothing else will do."

London, N.W.1. W. E. STEWARD,
Managing Director,
William Steward & Co., Ltd.

APROPOS of Mr. A. Cunnington's useful article and in particular his comment that "one does not expect to fumble at skirting level to find a bell push," I wonder why it is still necessary in most houses to grope in the dark for the next lighting switch? Why should one have to go into a dark room, find the switch and then obtain light? If you don't believe some of these switches take some finding, have a look at the next cream or white walled room you are in and then observe how often some unfortunate occupant has missed the switch and left his mark where it ought not to be!

Surely the right method is to arrange switching so that it controls the lighting ahead. Then, with a switch outside the room door instead of inside, one could see what one was reaching for and at the same time prevent little Alfie's dirty paw spoiling Auntie's beautiful new wallpaper!

Is there any reason why our contractor friends should not think—and act—on these lines?

Broxbourne, Herts. T. L. FRANKLIN.

MAY I comment on Mr. Cunnington's article? The 3 kW socket outlet and plug is now a standard article, conforming to B.S.1363, and variations, such as twin sockets, switch-sockets, switched plugs, etc., are readily available. The ring main arrangement is covered in the exemptions to Regulation 201 (c) of the I.E.E. Regulations. Small houses (up to 1,000 sq ft) may be wired with an unlimited number of sockets on one ring; larger buildings are limited to ten points on any one ring main.

This system has been used for some years and often shows a saving in installation costs for equal facilities. Mr. Cunnington's

suggestion of twenty points a house may be ideal, but six (two in the living room and one each in bedrooms and kitchen) appears to be adequate without being expensive. Sockets at hand height tend to be conspicuous. Standard lamps, fires, vacuum cleaners, etc., are readily served from skirting level. Electric irons are an exception, possibly overcome by installing a point in the kitchen at normal switch height. I share Mr. Cunnington's abhorrence of two-way lampholders and adaptors.

The ring main is popular in the Midlands, but the public, and some members of the electrical profession, require further education and publicity before its merits will be fully realized.

CYRIL H. DOWLER, A.M.I.E.E.
Selly Oak, Birmingham, 29.

Load and the Area Boards

THOSE present at the B.E.P.C. at Bournemouth last week heard an excellent exposition of the merits of electricity for cooking, water heating *and* space heating. Much of this was a useful reiteration of well-known facts, one of the most significant being that such utilization of electricity was useful and necessary to ensure a balance between industrial and domestic loads.

Now—let something be done to implement all that was said and I suggest that the Area Boards should start the ball rolling, particularly those who still maintain restrictions on the sale of equipment in their service centres and whose commercial departments are not able to accept heating loads, much as they would like to—because of instructions from Area headquarters.

The manufacturers are ready and anxious to help to ensure that electricity is restored to its rightful position in a national fuel policy. If the lead comes from the supply authorities, the manufacturers will not be slow to take advantage of that lead.

C. B. CLELAND.
Welwyn Garden City.

Equipment for Technical College

THIS College is developing under extremely difficult conditions in the field of engineering. We have had very good support from many sections of industry for the existing part-time day courses in mechanical engineering, both Ordinary National Certificate and craft (City and Guilds) subjects; our progress in electrical work is much less satisfactory.

We do not propose to offer further courses unless we have suitable apparatus for the practical work necessary, and the present supply position has handicapped us severely, in spite of fairly heavy financial expenditure by the Reading authority. We should be most grateful if you could draw the attention of the engineering industry to our development, in the hope that some members may be able to offer us some practical assistance with equipment.

We are hoping to be able to begin Higher National Certificate courses in mechanical and production engineering, but we are entirely dependent on the equipment involved.

Reading. P. E. HAWES,
Head of Department of Engineering,
Reading Technical College.

Built on Site

FROM a cursory examination of the photograph of a main switchboard that has appeared quite recently in your journal, may I raise what I think is an important point—one which I feel will provoke more than one reply.

As the tiers of switches are erected one directly above the other, it seems that the cables feeding the top switches must pass up through the bottom switches, unless of course it was required that the top switch in each tier should be fed from the one immediately below.

Moreover, unless the outgoing cables from the bottom switches pass back down and out through the busbar chamber (a practice that is not to be encouraged), it appears that these have to pass up through the top switch.

Bearing in mind the number and sizes of the cables that are used to connect the switches, or switch-fuses, there must be much more free wiring space in the switchgear used in this installation than it has been my experience to come across in the various makes of switchgear that I have worked upon.

Furthermore, in the tier of switchgear nearest to the camera it appears that the feeds are taken through into the side of the bottom switch from the end of the busbar chamber and, therefore, assuming that each switch is a t.p. and n. type, then at

least [illegible]elve cables must pass through the bott[illegible] switch and this does not include any [illegible]he outgoing feeders that might be take[illegible]t through the busbar chamber.

I [illegible]lize that to stagger each tier of switc[illegible] means, of course, that more space is re[illegible]ed for the switchroom, and know from [illegible]y own experience how reluctant some [illegible]ients and architects are when we requ[illegible] that we be allowed even the minimum [illegible]pace for our switchroom. An effici[illegible] and soundly designed layout of switch[illegible]ar should be our aim. Surely to stagg[illegible]our switchgear and thus allow each unit [illegible]be connected by means of suitable trunk[illegible]g or conduit to the busbar chamber, witho[illegible] the cables having to pass through other items of switchgear, is of prime impor[illegible]ance.

G. L. MONEY.

*London, N.*15.

Income Tax on Overtime

FROM those who are likely to derive benefit, there have been frequent suggestions that the only way to increase productivity would be to make income tax concessions on overtime. It is surprising, however, to have the support of this theory from such a high level as a speaker at the recent Power Convention. The immediate result would be to reduce output during normal working hours so as to ensure that overtime would be necessary.

In any case such a scheme if put into force would be a grave injustice to the people who have been carrying this country on their backs for the last five or six years. I refer to the salaried executive grades, both in private enterprise and nationalized industry, who normally work all the hours necessary for conscience' sake and no other incentive.

If it ever does happen that overtime is exempt from income tax then I for one will endeavour to persuade my employers to pay me at hourly rates.

Acton. A. J. WYNDHAM ROBERTS,
London Manager, Santon, Ltd.

Greek Telecommunications

IN your article on Greek telecommunications (13th June, p. 1309) you imply that there are no communications between the Greek islands and the mainland. This is apparently to be remedied by 1953 with the no doubt valuable assistance of American technicians.

I should like to point out that the Admiralty cable ship H.M.S. *Bullfinch* spent some considerable time on this very job in 1944–45. In two places we were the first Allied ship to enter on the heels of the retreating Germans and I can still recall very vividly the reactions of the locals when they found we had come to lay cables and not to supply them with much-needed food!

However, we did restore a degree of intercommunication under very adverse conditions, but apparently our popularity has not lasted to the extent of securing the "rewire" contract for England.

Our activities were not confined to the islands. We often made up-shore landing parties to go many miles inland patching up telephone lines and in general "opening up" after the fleeing Germans. For this purpose we carried a squad of soldiers some eighteen strong who richly deserved their name of "Bullfinch Commandos," and the sight of sailors and soldiers marching in line ahead caused much comment among the regular troops, not all favourable either!

Canterbury. PHILLIP R. S. MAY.

Joint Consultation

NO. 10 of the Acton Society Trust's series of studies of nationalized industry (30, Welbeck Street, London, W.1, 2s) deals with "The Framework of Joint Consultation." In it are outlined the different arrangements for consultation between representatives of the national boards and their employees. Distinction is made between those bodies which are purely consultative and those who also conduct negotiations for wages and conditions. The National Joint Advisory Council for the Electricity Supply Industry with the District Councils and Local Committees are of the first kind.

Comment is made on the thoroughness of the industry's approach to the "mechanics" of consultation but it is thought that this very thoroughness absorbs much of the time of management and union officials.

Factors which prevent the consultative system developing on the expected lines are said to be the unions' insistence on uniformity of treatment and their desire to apply decisions over the widest possible area; the apprehension of managements of possible threats to their authority and status; and the tendency of both parties to treat the system as a method of exerting power rather than a method of exchanging views.

PERSONAL and SOCIAL

News of Men and Women of the Industry

AT the June meeting of the Executive Council of the Association of Supervising Electrical Engineers, Mr. L. L. Emmett was elected national chairman of the Association for 1952-53. Mr. J. Flood, Associate I.E.E., was elected vice-chairman, and Mr. E. J. Sutton, M.I.E.E., was re-elected hon. treasurer. Messrs. D. Barke, J. H. McCarthy and W. Rowland were elected trustees. Mr. Emmett is electrical engineer with the United Leeds Hospitals, which is a teaching group under the National Health Scheme.

Mr. Frank W. Roberts, B.Sc., A.M.I.E.E., M.A.I.E.E., A.M.I.Loco.E., for many years a member of the Traction Division of Crompton Parkinson, Ltd., at Chelmsford, will shortly be joining the staff of the company's Canadian agents, Bepco Canada, Ltd. He will be technical liaison engineer between Bepco and the Gloucester Railway Carriage & Wagon Co. in connection with the supply and entry into service of 104 underground electric railway cars now being built for the Toronto Transportation Commission by the Gloucester Company which has appointed Bepco as its sole Canadian representative for the contract. This $8 million contract obtained by the Gloucester Railway Carriage & Wagon Co. comprises multiple unit trains with Crompton Parkinson traction motors and auxiliary equipment, together with B.T.H. control gear. It is expected that the cars will be put into service during 1953.

Mr. F. W. Roberts

Mr. R. A. Smith has been appointed president of the Electrical Contractors' Association of Scotland for the ensuing year. He is managing director of the electrical engineering and contracting business of Lowdon Bros. & Co. (Engineers), Ltd., Dundee.

Mr. Ronald Grierson informs us that his address is now 16, Sherington Avenue, Hatch End, Middx (telephone : Hatch End 735).

Mr. W. L. M. French, A.M.I.E.E., has been appointed engineering inspector in the Electricity Division of the Ministry of Fuel and Power.

The President of the Portuguese Republic has conferred the honour of Commander of the Order of Industrial Merit upon **Mr. I. T. Richards,** M.I.E.E., managing director of Automatica Electrica Portuguesa S.A.R.L., the manufacturing subsidiary company of the Automatic Telephone & Electric Co., Ltd., in Portugal. Mr. Richards is also a director of Cabos Armados e Telefónicos, Lda., the Portuguese associate of British Insulated Callender's Cables, Ltd.

Mr. I. T. Richards

Mr. C. H. Chaplain, manager, Publicity Department, British Thomson-Houston Co., Ltd., has been elected chairman of the B.E.A.M.A. Publicity Committee, and **Mr. V. J. Faulkner,** publicity manager, Crompton Parkinson, Ltd., has been elected vice-chairman.

Mr. H. E. Goody, manager of "Mazda" lamp and lighting advertising for the British Thomson-Houston Co., Ltd., since August, 1921, is retiring as from 31st July next. Mr. Goody has been connected with the electrical industry for fifty-three years, having been apprenticed in 1899, and his association with B.T.H. lamp advertising dates from 1912, being broken only by five years' war service. One of his main interests on entering publicity was the distribution of editorial information on events of general news and technical interest and during the early years of his work in advertising he instituted one of the first services of this kind introduced in the electrical industry.

Mr. H. E. Goody

After two years with the B.T.H. Advertising Department, Mr. Goody enlisted in the

Royal Fusiliers in 1914 and was wounded whilst serving in France. Later he was commissioned in the Royal Flying Corps and was again wounded, this time whilst making a parachute descent. He returned to B.T.H. in 1919 and succeeded to the management of the Lamp Advertising Department in 1921. During the inter-war years he was associated with the work of several committees and was a permanent member of the E.L.M.A. Publicity Committee and, for some years, was on the Council of the Incorporated Society of British Advertisers.

Mr. R. Benham, who joined the company in 1950, has been appointed assistant manager of Johnson, Matthey & Co.'s plating works at Maidenhead.

Mr. Vernon Young, previously a special director of International Combustion (Holdings), Ltd., has been appointed a full director.

Mr. K. A. Spencer, B.Sc.Tech., A.M.C.T., A.M.I.Chem.E., is taking up consulting corrosion engineering practice with special emphasis on coating materials and application of cathodic protection. His addresses are 5, Greencourt Road, Petts Wood, Kent, and 40, South Street, London, W.1.

Mr. A. K. Clyde, A.R.T.C., A.M.I.E.E., A.F.R.Ae.S., has been appointed assistant chief engineer of Tiltman Langley Laboratories, Ltd., Redhill, Surrey. Mr. Clyde, who was educated at the Kelvinside Academy and the Royal Technical College, Glasgow, was from 1936 to 1938 a research engineer with CAV Bosch at Acton and was later with the Royal Aircraft Establishment, Farnborough, the Ministry of Aircraft Production and the Ministry of Supply.

Col. W. M. Lapper, former chairman of the Yorkshire Electricity Board, has been appointed as chief assistant to the generation (operation) engineer, B.E.A.

Mr. B. H. Stonehouse, B.Sc., of the General Electric Co., Ltd., Witton, Birmingham, has been elected chairman of the South Midland Students' Section of the Institution of Electrical Engineers for the 1952-53 session.

Mr. J. Watson

Mr. C. J. Johnson

Mr. C. Haydon-Brash is taking up an appointment as sales representative with C. M. Churchouse, Ltd., from 1st July. Mr. Haydon-Brash has been with the lighting section of Veritys, Ltd., at their London depot as a sales engineer.

Mr. G. A. Jackson has been appointed manager of the Spare Parts Division of E.M.I. Sales & Service, Ltd., as from 1st June in succession to the late Mr. E. S. Rann. Mr. Jackson, who has been associated continuously with the radio industry since 1922, joined the Marconiphone Service Division in 1923. He was transferred to the Special Products Department in 1930 and in 1936 was appointed to take charge of the Marconiphone depot in Birmingham. During the war he was attached to the E.M.I. Service Division at Hayes, acting in a technical capacity in connection with the servicing of all types of wartime electronic equipments.

Mr. G. A. Jackson

Mr. K. A. Russell, B.Sc., A.M.I.E.E., chief engineer of British Relay Wireless, Ltd., and associated companies was elected president of the Society of Relay Engineers at its annual general meeting held recently in London.

Mr. C. J. Johnson, who has been Birmingham branch manager of Crompton Parkinson, Ltd., since 1950, has been appointed sales supervisor (training) attached to head sales office in London. Mr. Johnson joined the Maidstone Branch as a representative in 1945 after twenty-two years with A. T. Moyle, Ltd., automobile, electrical and radio engineers in Sussex. In 1947 he was appointed assistant manager at the Manchester Branch. Mr. Johnson's place at Birmingham will be taken by **Mr. C. Whitaker,** previously manager at the Cardiff Branch, who has been with the company since 1938, first as a London salesman and later as assistant to the Manchester manager until his appointment to Cardiff in 1947. **Mr. J. Watson** will be the new Cardiff branch manager. He joined the company in 1939 as a lighting engineer and took over the position of assistant branch manager at Manchester in 1947.

Mr. C. Whitaker

The Hon. Mrs. Leslie Gamage distributing the prizes at the G.E.C. Wembley sports, a note about which appeared in our last week's issue

There were seventeen applicants for the vacant post of city electrical engineer of Belfast and the sub-committee appointed to draw up a short list has decided to recommend the appointment of **Mr. R. P. Watson,** B.A., B.A.I., M.I.E.E., who was advanced from sales manager to his present position of deputy city electrical engineer following the resignation of Mr. J. M'Candless.

Mr. A. Reynolds, chairman and managing director of the Bestfrend Electrical Co., Ltd., has been presented with a walnut occasional table to mark the company's completion of twenty-one years. Arrangements have been made for this year's annual outing to take the form of a week-end in Paris commencing to-day (Friday).

Mr. J. H. Peters of Connah's Quay retired recently. Mr. Peters was formerly electrical engineer to Connah's Quay U.D.C., having joined the electricity undertaking in 1925 as its first electrical engineer. In 1948, when the Merseyside and North Wales Electricity Board took over the system, he continued to serve in an engineering capacity. To mark Mr. Peters' retirement Mr. R. N. Pegg, Sub-Area manager, presented him with a gold wristlet watch and testimony to his service was made by Mr. G. F. Davies, Mr. E. J. Brett and Mr. Parish. The District staff organized a farewell dinner at the Custom's House Hotel, which was attended by Mr. and Mrs. Peters and their family.

Mr. A. C. Lewis, who has been associated with the Aberdeen depot of the Marconi International Marine Communication Co., Ltd., since 1933, is retiring at the end of August. Mr. Lewis, who joined the Marconi Marine Co. as a seagoing radio officer in 1905, became depot superintendent at Aberdeen in 1935 and took over responsibility for all contracts in the area, as contracts representative for Northern Scotland, in 1948. On his retirement contract work in the area will become the responsibility of **Mr. V. G. Oastler,** manager of the company's Aberdeen depot since 1948. Mr. Oastler, who also joined the company as a seagoing radio officer in 1929, will retain his title of deputy manager and **Mr. P. G. T. Sloggett** is appointed assistant depot manager.

Prof. G. C. McVittie is resigning from the chair of mathematics in Queen Mary College, London, to take up the post of professor of astronomy and head of the department in the University of Illinois. He will be succeeded at Queen Mary College by **Prof. V. C. A. Ferraro,** Ph.D., who at present occupies the chair of applied mathematics in the University College of the South West of England, Exeter. Prof. Ferraro has carried out considerable work, in conjunction with Prof. S. Chapman, on the theory of magnetic storms and the aurora.

More than 1,000 employees of **Oldham & Son, Ltd.,** Denton, Manchester, went to Blackpool on 14th June for their annual outing. Each received 15s as spending money, and was provided with admission tickets to various places of amusement. Thirty motor coaches were needed to transport the large party. Lunch was served in the Spanish and Baronial Halls, Winter Gardens, when a civic welcome was given by the Mayor and Mayoress of Blackpool, Councillor Peter Fairhurst, J.P., and Mrs. Fairhurst. Mr. Edward C. Oldham, one of the company's three joint managing directors, was present with Mr. S. J. Wrigglesworth, director and general manager (who presided) and Mr. W. Elkin Platt, director.

OBITUARY

Mr. Leon Freeman, the founder (in 1900) of the Freeman Electrical Co. (London), Ltd., died on 20th June. Mr. Freeman, who retired some years ago, had been ill for some time.

Mr. J. A. Thomson.—The death occurred on 20th June, at the age of seventy-two, of Mr. James Albert Thomson, chairman and managing director of Brown Bros., Ltd. Mr. Thomson

was past-president of the Society of Motor Manufacturers and Traders.

J. A. Martin, whose death at the age of sixty-two is reported, had been with E. K. Cole, Ltd., for twenty-three years, latterly as representative for the West Lancs area.

W. C. Devereux, C.B.E., who died on 21st June at Ascot, was managing director of Alfa, Ltd., and chairman of International Alfa, Ltd. He was fifty-nine.

WILLS

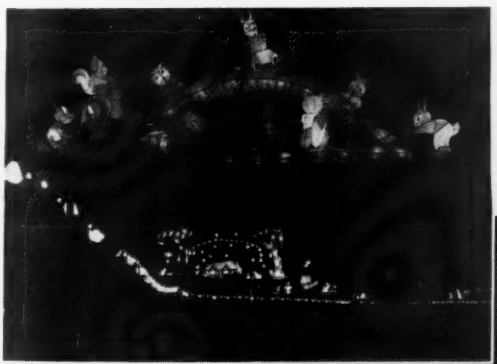
Mr. H. E. Ellis, of Hove, managing director of the City Electrical Co., Ltd., who died on 4th December last, left £45,269 gross (£44,637 net).

Mr. C. E. Veitch, chief electrical engineer to the Weyburn Engineering Co., Elstead, who died on 10th March last, left £4,556 gross (£4,296 net).

Spectacular Ramsgate Lighting

WHEN the "Festival of Light" was switched on for the first time at Ramsgate (Kent) last year a promise was made that the very attractive display would later be augmented. This year the period of the illuminations has been extended, commencing on 31st May and lasting until 18th October, while new effects have been provided. Some of the most spectacular additions were seen for the first time last week when the "Pier of Fantasy" was inaugurated. This comprises a series of fourteen tableaux made up of three-dimensional nursery rhyme and cartoon style characters which are formed of a plastic material sprayed on to a wire framework. They are internally illuminated, approximately 1,500 "Ediswan" lamps being used. A number of the displays are mechanically operated so that they are of interest both by day and night. The pier tableaux have been devised and produced by the Franco-British Electrical Co., Ltd., in association with the Corporation, the total cost being in the neighbourhood of £15,000.

It is claimed that the illuminations at Ramsgate are among the most colourful in the country and on a visit to the town last week we learned from Mr. W. E. C. Vincent, the publicity officer, that the results last year demonstrated that the expenditure was well worth while. We were shown round the new set-pieces by Mr. T. Wharton, formerly of Blackpool. Besides the East Pier attractions the illuminations include fountains and flower beds, under-water lighting, a 160ft long "Ship of Light" and vivid silhouette effects from ultra-violet lamps. More than 25,000 lamps—a large number of which are "Mazda" 40 and 60 W colour-sprayed types—are used to light the two miles of sea-front.



"The Sleepy Dragon," one of the new "Pier of Fantasy" tableaux at Ramsgate and (right) a view of the harbour illuminations

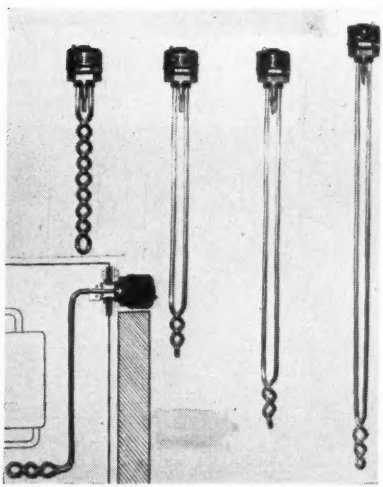
Adaptable Immersers

THE outstanding feature of a range of new "Duo-Coil" immersion heaters introduced by Gillott Electro-Steam Cookers, Ltd., is their adaptability. The tubular sheaths of these heaters can be bent to any desired shape, so that by a selection from the four models almost any size or shape of water tank can be equipped. A special but simple bending jig is employed.

Although the heaters differ in length from 14 to 35 inches, they all have the same electrical loading in respect of one voltage, although for easy reference two loadings are styled in the makers' trade literature as 2·5 kW for the 230/250 V range, and 2 kW for 200/220 V. The tubular element in each case is of the simple loop type, but at the actual loop end the sheathed element is shaped into a double spiral ("Duo-Coil"), and to a large extent this spiralling, which itself varies in length according to the overall length of the heater, is responsible for the one loading for four lengths of heater. The smallest (14in) model is spiralled throughout the entire loaded length of the element, and is intended for horizontal installation only. The other models are designed for vertical installation.

The heaters are thermostatically controlled, and in each case at the head the bi-metal thermostat incorporates a micro-gap switch. A device is fitted to prevent radio and television interference. The element is a central resistor, running the whole length of the sheath, entirely surrounded by powdered insulating material, and this accounts for the ease of bending. The normal temperature setting is 150 deg F.

Gillott "Duo-Coil" immersion heaters, showing how they can be bent for installation



Parliamentary News

DURING the House of Commons debate on Monday last on the new B.B.C. licence and agreement, Mr. Gammans, Assistant Postmaster General, referred to future developments. He said that the Government hoped to see in operation during the present lifetime of the licence the development of very high frequency; television in colour; and the reception of television programmes from abroad. So far as sound broadcasting was concerned, we were not likely to get many more medium wavelengths. There was only one way out and that was the introduction of very high frequency. This had gradually become the normal method of transmission for most parts of the country although medium wave transmission would continue for many years, while there were several parts of the country where it was more suitable than v.h.f.

Colour television was a most desirable development but an extremely expensive business and he could give no indication when the B.B.C. would be able to operate it. It was technically possible to broadcast in colour and receive the programme in black and white as at present. There was to be an interesting experiment next month in television programmes from France. Television transmission across the Atlantic via Newfoundland and Iceland was possible technically, but a vast amount of money would be required.

Electric Shock from Buses

Mr. Braithwaite, replying to Mr. Poole, said that motor vehicles generally were liable to build up charges of static electricity and a shock might result. London Transport had taken all possible steps to eliminate the possibility of such shocks and complaints from the public had practically ceased. The shocks were not dangerous and the Minister saw no ground for any action on his part.

Control of Copper

Mr. Arthur Lewis asked the Minister of Supply whether, in view of the improvement in supplies, he intended to discontinue price control, licensing and distribution of copper.

Mr. Sandys said that this would not be practicable since copper was still subject to international allocation and the supplies to this country were still insufficient to meet current requirements.

OVERSEAS ELECTRICAL TRADE

Satisfactory May Figures

ALTHOUGH electrical exports from this country in May did not reach the record figure for March, at £16,414,836 they were still substantially higher than in the corresponding month of 1951 and in April this year. The cable class (including submarine) contributed largely to the increase with a total of £3,190,363 against £2,127,530 in May, 1951; only cables insulated with other materials than paper and rubber registered a decline. Australian purchases of non-submarine telegraph and telephone cables and paper insulated cables were smaller but New Zealand's higher imports more than counterbalanced this. South Africa, too, was a good customer for cables.

A feature of the trade in commercial radio apparatus was a fall from £125,443 to £2,162 in India's purchases, largely compensated for by larger shipments to unspecified Commonwealth and foreign countries. There was a fairly substantial decrease in domestic radio exports for which

TABLE I.—ELECTRICAL EXPORTS

Class	May, 1951	May, 1952
	£	£
Telegraph and telephone cables and wires (submarine)	12,711	56,467
Ditto, not submarine	556,098	963,895
Wires and cables, paper insulated	622,504	875,895
Ditto, rubber insulated	538,880	801,757
Ditto, cotton, silk or artificial silk insulated	70,415	60,041
Ditto, enamel, glass or asbestos insulated	101,671	58,431
Ditto, other	225,251	373,877
Commercial radio apparatus	597,094	629,827
Domestic radio apparatus	413,507	353,247
Telegraph, telephone and signalling apparatus	1,137,776	1,528,260
Radio loudspeakers	60,988	72,766
Telecommunication components, n.e.s.	512,050	583,545
Other telecommunication apparatus	144,984	161,818
Valves and cathode-ray tubes	396,376	291,589
Carbons	27,144	20,043
Lamps, exceeding 24 V	106,709	97,342
Ditto, not exceeding 24 V	39,495	29,300
Other lighting appliances	361,082	459,565
Primary batteries	217,520	262,888
Parts other than carbons	32,303	23,592
Accumulators for motor vehicles	258,320	277,502
Ditto, traction	13,877	6,880
Ditto, radio	7,013	11,924
Other portable accumulators	87,265	57,920
All other accumulators	51,292	81,053
Parts and accessories	56,614	74,032
Cooking appliances	216,007	247,563
Heating appliances	93,925	96,202
Parts and accessories for cooking and heating appliances	60,826	87,160
Flat irons	87,521	81,012
Commercial electrical instruments	134,036	132,289
House service meters	106,573	169,404
Time recorders and time switches	31,664	4,380
Other electrical instruments	154,794	128,452
Electro-medical apparatus (not X-ray)	60,077	40,842
X-ray apparatus, tubes and parts	123,041	134,754
Permanent magnets	28,465	33,306
Insulating cloth and tape	109,520	91,688
Other insulating materials	114,664	98,567
Unclassified electrical goods and apparatus	513,894	657,952
TOTAL, electrical goods and apparatus	8,483,946	10,217,027
Diesel driven generators not exceeding 200 kW	415,694	465,246
Ditto, exceeding 200 kW	342,278	209,421
Other generating sets	86,771	106,501
Generators exported without prime movers, and parts of generators	341,525	483,634
Motors, railway, tramway and trolley bus	9,822	6,876
Ditto, other, not over ½ h.p.	152,105	205,163
Ditto, over ½ h.p. but under 1 h.p.	60,844	70,584
Ditto, from 1 h.p. to 250 h.p.	453,217	450,708
Ditto, exceeding 250 h.p.	102,851	65,153
Ditto, parts	94,954	116,937
Converting machinery	28,147	25,802
Transformers, including coils	835,425	871,065
Rectifiers for power house use	59,202	77,026
Motor starting and controlling gear	194,999	215,126
Switchgear and switchboards (not telegraph and telephone)	1,007,824	1,397,701
TOTAL, electrical machinery	4,185,658	4,766,943
Washing machines (not exceeding 250 lb weight)	529,230	471,878
Ditto, parts	22,889	53,761
Vacuum cleaners	295,806	216,038
Ditto, parts	52,445	47,830
Other electrically operated portable appliances and parts	169,139	193,288
Portable electric tools	94,861	113,713
Unspecified electrical machines, machinery and parts	303,563	334,358
GRAND TOTAL	14,137,537	16,414,836

South Africa was in the main responsible.

Telegraph and telephone exports were well maintained. Australia's share fell from £245,337 to £133,882 but again New Zealand came to the rescue and increased her purchases from £40,088 to £222,877.

Australia actually increased her imports of cooking and heating apparatus as did South Africa, while New Zealand's quota jumped from £6,295 to £95,813. Purchases by the Irish Republic declined from £66,479 to £35,500. The general use in this section can be considered encouraging.

A slight rise occurred in the instrument section, where a large decrease in the case of Australia (from £49,993 to £5,60 was offset by the larger amounts taken by South Africa, India and New Zealand. It should be noted that in this section only the exports of house service meters increased.

Looking at the goods and apparatus class as a whole, it is not surprising that New Zealand (£913,509) was by far the biggest customer; in May, 1951, her total purchases were only £164,038 in value. India and South Africa were next. As was to be expected, Australian restrictions are beginning to be felt and that country's share of the trade fell from £767,032 to £435,319. A noteworthy point is the increase in trade with Canada (from £183,747 to £255,143).

The increase in the exports of electrical machinery was of a smaller character but still fairly satisfactory. There was a rise in small diesel-electric sets but a substantial decrease in the over 200 kW class. A very large rise occurred in exports of generators and parts. Fractional h.p. motor shipments were well up but those of the larger machines were lower. The upward trend in exports of electric washing machines and vacuum cleaners was halted; in fact there was a somewhat large falling-off.

Table II.—Distribution of Electrical Goods and Apparatus

Destination	May, 1951	May, 1952
Channel Islands	52,654	38,245
Gibraltar	5,522	36,463
Malta and Gozo	9,569	22,760
Cyprus	52,854	26,085
British West Africa	132,331	246,737
Union of South Africa	699,891	724,541
Northern Rhodesia	17,120	99,295
Southern Rhodesia	95,975	270,383
British East Africa	214,780	157,584
Bahrein, Qatar and Trucial Oman	23,224	35,310
Kuwait		32,006
India	745,706	747,987
Pakistan	249,969	340,063
Malaya	359,292	439,777
Ceylon	112,241	97,358
Hong Kong	342,483	236,020
Australia	767,032	435,319
New Zealand	164,038	913,509
Canada	183,747	255,143
British West Indies	112,031	227,594
Anglo-Egyptian Sudan	45,791	84,586
Other Commonwealth Countries	47,667	116,356
Irish Republic	460,596	340,381
Soviet Union	26,249	17,666
Finland	60,334	201,988
Sweden	349,055	348,172
Norway	171,357	212,043
Iceland	25,212	26,007
Denmark	149,142	132,292
Poland	37,559	27,202
Germany	40,999	52,580
Netherlands	333,932	309,353
Belgium	147,563	136,296
France	118,639	63,983
Switzerland	41,706	46,894
Portugal	100,105	93,823
Spain	20,541	80,889
Italy	64,868	111,130
Austria	74,277	31,979
Czechoslovakia	4,566	12,874
Greece	64,645	108,456
Turkey	85,541	364,412
Portuguese East Africa	17,456	14,181
Syria	26,229	11,834
Lebanon	19,363	43,517
Israel	53,950	35,921
Egypt	190,757	265,054
Arabia	56,252	39,507
Iraq	72,502	105,034
Iran	159,106	15,383
Burma	52,723	70,734
Thailand	81,481	74,288
Indonesia	32,597	136,615
China	55,749	400
United States of America	110,429	112,432
Venezuela	27,797	138,780
Peru	76,607	40,010
Chile	33,072	42,341
Brazil	233,798	267,352
Uruguay	34,336	35,302
Argentine Republic	150,026	86,232
Other Foreign Countries	188,913	380,566
Total	8,483,946	10,217,027

Birlec Silver Jubilee

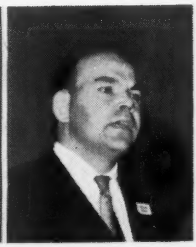
THE silver jubilee of Birlec, Ltd., was celebrated on Friday, 20th June, and a number of events were held during the week to mark the occasion. On 14th June, a sports day was held at the company's sports field, Walmlay, Sutton Coldfield. On 17th June a dinner was given at the Welcombe Hotel, Stratford-on-Avon, to forty employees with more than twenty years' service at which Mr. L. H. Cooper (chairman), presented gold buttons to four members of the company who had completed twenty-five years' service. These four included Mr. G. P. Tinker and Mr. T. G. Tanner, managing and technical directors. In addition a gold watch was presented to Mr. E. Rawes, secretary, who had completed forty years within the Inco (International Nickel Co. of Canada, Ltd.) organization. On 20th June the silver jubilee dinner was held at the Queen's Hotel, Birmingham, and on the following day two special trains took the 400 employees and friends to Blackpool.

Bournemouth Convention

Discussions and Events

Last week we produced an illustrated summary of the proceedings at the fourth British Electrical Power Convention at Bournemouth. For record purposes we give in the following pages a somewhat fuller report of the discussions and other events, with further pictures. First we deal with the speakers in the discussions of the papers by Messrs. R. Y. Sanders, C. H. Smith, J. A. Fraser and R. Berry abstracted in our last issue.

Dame Caroline Haslett



Mr. A. C. Hazel

Domestic Electricity

In presenting his paper on electric cooking, Mr. J. A. Fraser emphasized the need for some body which could speak for the electrical industry as a whole. It was perhaps unfortunate that the E.D.A. was solely controlled by the supply industry and did not have manufacturing representation. Had it been otherwise, it was possible that more freedom of speech would have been possible on the wider aspects of electrical development in the past few years. There must be combined action by the supply and manufacturing sides of the industry, with power to make decisions and to act on them promptly.

Dame Caroline Haslett (E.A.W.), who opened the discussion, said the days of easy development on the domestic side had gone, and the electricity supply industry had now to produce facts and figures and to carry out research if it was to answer its critics. Without the diversity provided by the domestic load, the industry could not provide cheap electricity.

Mr. A. C. Hazel (B.E.A.M.A.) said that there was a tendency on the part of the fuel-producing industries to regard the public as "consumers" capable of being dictated to and not as customers who must be free to decide what they wanted. It was an impertinence to tell them that they must use this and must not use that. He made radiators which could use gas, electricity or paraffin. If he made a gas radiator, it carried a purchase tax of 66⅔ per cent; if he made a paraffin radiator, it attracted no purchase tax at all; but an electric radiator bore a tax of 100 per cent. One of the great features in favour of electrical appliances was their safety, and this should be emphasized. The electrical industry should press for the proper heat insulation of houses, which would promote the use of electricity for heating.

Comparative Efficiencies

Mr. O. W. Humphreys (I.E.E.) welcomed what he described as a belated defence of the use of electricity for domestic purposes, and remarked that he was disturbed by the method of assessment of coal conservation in the case of gas and electricity. The Egerton Committee had given two alternative efficiencies in the case of gas, 73 and 48 per cent, but he believed that it was a mistake to use the figure of 73 per cent. The gas industry was entitled to claim credit for the whole of the heat content of the products yielded by carbonization, irrespective of what they were used for, but for present purposes they were concerned with the proportion of the heat in the coal which was used for the heating of houses, and what was required for that purpose was simply the ratio of the heat content of the coal to that of the gas and coke which it yielded, which would give a figure of about 55 per cent.

It was his opinion, based on a prolonged and detailed scientific analysis, that the average heating service required in British homes, with its variation in demand, could

Mr. O. W. Humphreys | Mr. J. I. Bernard | Mr. J. S. Warren | Mr. J. Gogan

be provided better by electricity than by any other single acceptable method of heating.

The country needed its gas industry, its solid fuel industry and its electricity industry, which ought to live in harmony, getting on with their tasks in healthy rivalry.

Cooking Development

Mr. J. I. Bernard (E.D.A.) said that before the war the development of electrical cooking in the United States had been very much behind that in this country, but in the last eighteen months American development had exceeded our own, largely, he thought, because there was much greater competition in the United States. Anyone who replaced a gas cooker by an electric cooker would find that 12 kWh would give the same cooking service as a therm of gas. The gas industry claimed to get 75 therms of gas and 10 cwt of coke by carbonizing a ton of coal, so that, allowing $1\frac{1}{2}$ lb of coal burnt at the power station per kWh, $10\frac{3}{4}$ cwt of coal burnt at the power station would give the same cooking service as a ton of coal carbonized at the gasworks, the gasworks being left with 10 cwt of coke to dispose of. It was unfortunate that when circulators were used and all switched on in the early morning there was a very great fall in diversity as compared with the normal diversity with thermostatically-controlled water heaters. Efforts must be made to educate consumers to prefer constant hot water.

Mr. J. S. Warren (B.E.A.M.A.) said that electric fires and heaters, when properly used, made far less contribution to the peak than many people supposed. Some retail outlets should abandon their negative policy of not displaying electric heating appliances in their showrooms and adopt a positive policy of educating their customers when and where to use them in a manner which would assist the nation's fuel economy. The social survey conducted by the Central Office of Information in 1948–49 showed that electric and gas heaters, and particularly portable electric heaters, were being used not to replace coal but to provide short-period heating in rooms which would not otherwise be used.

Mr. J. Gogan (S.W. Scotland Electricity Board) referred to the case of a housing authority who, on a large estate of thousands of houses, decided to install gas at an extra cost of £30–£35 per house. He pointed out that if this were done for all the 300,000 houses a year which it was the Government's policy to erect it would cost £10 million, apart from the waste of steel involved. No choice was being given to the housewife, although an independent inquiry sponsored by a Government Department had shown that 58 per cent of the population preferred electricity. Bertrand Russell had said "One generation of fearless women could transform the world." He hoped that that generation was the present one.

Thermal Storage

Miss M. V. Griffith (E.R.A.) agreed with Mr. Sanders that such methods as floor-heating were of value because of their inherent storage, but did not think that it could be said at present that attempts to develop portable storage heaters were likely to go unrewarded. What could be more elegant, she asked, than the use of the energy absorbed and released by a change of state of a crystalline salt to effect the storage of electricity in a small volume of material for later use? This problem was being investigated by the E.R.A.

Miss M. V. Griffith | Mr. J. F. Field | Sir William Walker | Mr. C. T. Melling

She was surprised that no speaker had mentioned the heat pump, a device which transformed electric heating from a low-capital-cost high-running cost method to one of high capital cost and low running cost. This at once brought electricity into the picture for base-load space and water heating. Extreme winter conditions could be met by already-existing solid fuel appliances, which would cut the initial cost of the heat pump by limiting its capacity. By attending to the insulation of his house the consumer would find that half a watt per cubic foot would be sufficient for background heating.

Better Use of Coal

Mr. J. F. Field (S.E. Scotland Division) pointed out that one great virtue of gas was that it could be stored, and said that it was possible to make gas and electricity simultaneously, and their integration seemed to be indicated. More and more electricity would be required for industry, and the only chance of getting it was to make better use of the coal available. At the moment the B.E.A. bought about 37 million tons of coal a year and was obliged to throw away the heat equivalent of 25 million tons to heat up rivers and cooling towers and so on. The industry would be in a vulnerable position so long as it was open to the charge of throwing away valuable heat.

Sir William Walker (past-president, I.M.E.A.) urged the industry not to adopt a policy of apology but to recapture its old fighting spirit, and referred to the danger to the health of the housewife from the products of combustion due to the use of gas appliances in the small kitchens of modern houses.

Mr. C. T. Melling (E.D.A.), summing up, said that the electrical industry was compelled by force of economic circumstances to safeguard its cooking, water-heating and comfort-heating loads, because if it lost them it would have to subject consumers to a considerable rise in charges. Moreover, in the near future there must be a considerable increase in the industrial load, and that must be balanced by an improvement in the domestic load. We could not expect to export electric cookers if we condemned our own people to use gas. The best foundation for a sound export industry was a healthy home market.

The chairman of the Gas Council had stated recently that there were still six million old black gas cookers in this country and another authority had said that they used at least twice as much gas, and therefore coal, as the modern gas cooker. Mr. Sanders had shown that the present-day electric cooker used no more coal than the modern gas cooker, and must therefore use much less than these old black cookers. There were also nearly ten million old-fashioned coal fires which had far from anything approaching the economy of electric fires.

Plant Shortage

So far as plant shortage was concerned, a position had now been reached when a campaign for these domestic loads could safely be carried out without jeopardizing the supply to industrial consumers, even though under extremely difficult weather conditions there would still be risks.

Mr. S. F. Steward (B.E.A.), who proposed a vote of thanks to the authors, emphasized that electricity was not merely a method of extracting energy from coal; it was a way of life. If fuels were to be judged on the

basis of a mathematical formula, both sides of the equation must be given, and to do this it might be necessary to introduce a new unit, which he would call HWh—housewife-hours. It was known that 6×10^8 HWh were used every year in dealing with solid fuel stoves and cookers alone. In the domestic field the housewife would have the last word, and he believed that that last word was going to be electricity.

Electrical Research

Seven papers were presented on the Tuesday afternoon, the authors being Sir Arthur Fleming, Dr. S. Whitehead, Dr. J. S. Forrest, Dr. K. J. R. Wilkinson, Mr. W. F. Simonson, Mr. E. L. Davey and Dr. J. N. Aldington. The last paper was accompanied by striking demonstrations of lighting. Sir Arthur Fleming's paper was, in his absence, presented by Mr. J. T. Kendall and in Dr. Wilkinson's absence, through illness, his paper was read by Dr. Blake. The presentation of the papers had to be compressed into a period of slightly over two hours, and only about twenty minutes was available for their discussion.

Dr. P. Dunsheath

Dr. P. Dunsheath (E.D.A.) said that the occasion must be unique in the history of research exposition; a vast amount of information of great value to the industry had been given. Dr. Aldington had shown not only the beauty of some of the developments of the lamp industry but the great ingenuity required to manufacture on a mass production basis many of the complicated parts required. Dr. Dunsheath doubted whether the individuals who had produced these remarkable results had been given full credit before the profits of the industry had been calculated for purposes of criticism.

It had been reported recently that the United States Government was spending £540 million a year on research, in addition to £430 million from other sources. The most expensive research was cheaper than learning by experience. Research, said Dr. Aldington, was one of the nation's soundest investments.

Mr. E. B. Wedmore (E.R.A.) stressed the need for providing means by which the discoveries of research could be applied quickly in production. One of the advantages of the co-operative research committee was the opportunity which it provided for the investigators and those who wished to utilize their results to make personal contact.

While the managing director of any organization might be able to forecast the results of his company in 1953, what would happen in 1963 depended on the research which was being carried out, and on the means, psychological as well as technical, which were being taken to see that it was applied.

Mr. D. P. Sayers (B.E.A.) thought that there was a certain air of complacency in the papers about what was being done in the field of research; a vast amount still remained to be done and there were innumerable opportunities for economic and technical improvements in present engineering techniques. Dr. Wilkinson had not mentioned, for instance, that the circuit breakers referred to in his paper cost £50,000. While they had to deal with normal load currents of 800 to 1,000 A, the design had to provide for the stresses arising

Dr. R. S. Vincent giving his lecture-demonstration on high-performance dielectrics at the Convention

in rupturing fault currents of 10,000 A or more. There was need for some mechanism, possibly electronic, which would prevent the building up of such currents, so that the energy to be dealt with at the instant of rupture would be quite small, enabling the cost of the switch required to be perhaps one-tenth the cost of the circuit breakers used at present. Giving another example, he said that there were 25,000 galvanized towers in the grid all of which required regular painting at a cost of £100,000 a year, in addition to the line having to be out of commission for lengthy periods. Chemical and metallurgical research should result in the production of a more durable material.

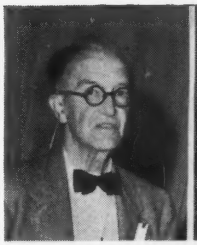
He would like to see greater appreciation, particularly in applied research, of the need for co-operation between manufacturers and users. Experience had shown that even the most elaborate laboratory tests could not completely simulate service conditions. It was a fallacy to believe that technical standardization must always be inimical to research and development.

Standardization of requirements by users and rationalization of designs and methods by manufacturers offered a reasonable prospect of increased production per worker and a better use of available resources.

Deleterious Coal Constituents

Mr. J. A. Vice (W.T.B.A.) referred to Mr. Simonson's statement that the 100 MW unit boiler would burn 45 tons of coal an hour and to his further remark that fractional percentages of deleterious constituents in the incombustible ash might be of serious significance, and pointed out that even if such constituents represented only 0·01 per cent of the fuel burned their throughput on eleven months' steaming on a base-load plant would be about 30 tons, and if only 1 per cent stuck somewhere the station engineer would have to deal with 6 cwt of deleterious material.

Mr. G. N. Green (Eastern Electricity Board), dealing with the comparison of belted and screened types of cable, said that one of the most important cables for an Area Board was the 11 kV. The screened type had many advantages, such as reduced dielectric thickness, higher thermal rating and greater freedom from faults, and research was needed to enable its cost to be brought down, so that it could be purchased at no higher cost than the present belted type. The end product of all this research was the price paid by the consumer, coupled with reliability of supply.

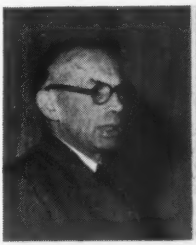


Mr. E. B. Wedmore

Mr. D. P. Sayers

Mr. J. A. Vice

Mr. G. N. Green



Mr. J. O. Knowles

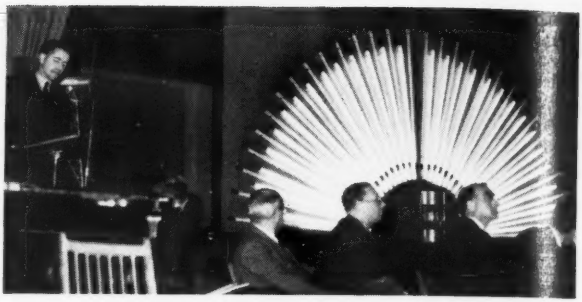
Mr. H. F. Sherborne

Mr. J. O. Knowles (B.E.A.M.A.) said that many E.R.A. reports and I.E.E. papers rightly dealt with new knowledge, on the outside limits of existing knowledge, but there was great scope for the dissemination of what might be described as nearly new knowledge to middle-size firms, many of which at present did not give much support to the E.R.A. or expect much from it, and to departments of large firms. The E.R.A. should take active steps to bring relevant

knowledge orally to the notice of some of those who received its reports but appeared seldom or never to read them.

Mr. H. F. Sherborne (B.E.A.M.A.), commenting on Dr. Forrest's statement that there was still a lack of reliable information on the corrosion- and erosion-resisting qualities of various alloys for condenser tubes, said that it would be more correct to state that there was more information on that subject available to-day than ever before, and that manufacturers, the British Non-Ferrous Metal Research Association and, above all, those who ran power stations had a vast fund of reliable information on the subject.

A vote of thanks to the authors was proposed by Sir John Hacking.



Dr. J. N. Aldington giving his lighting demonstration

Annual Dinner

The principal guest at the annual dinner was Viscount Swinton, Chancellor of the Duchy of Lancaster and Minister of Materials. Proposing the toast of "The Electrical Industry" Viscount Swinton said he had presumably been asked to do this because he was supposed to be the co-ordinator or arbiter in the distribution of scarce materials. He would like to point out to any ex-civil servant present that he said "scarce materials" and not "materials in short supply."

There was a good deal more scarcity than many people realized. It arose in some cases—for example, sulphur, nickel, and, so long as the rearmament programme lasted, copper—because the materials themselves were scarce, and in others because, although there might be plenty in the world, we had to husband our resources to preserve our precarious balance of payments.

So far as copper was concerned, we were fortunate both in the new developments in Rhodesia and in the fact that the Rhodesian producers had played the game; but, even if all the new developments could be carried out rapidly and fructified, there would still have to be restrictions on the use of copper and the substitutions of more plentiful materials.

As regarded steel, even if we obtained all that we hoped to get from the United States there would still not be enough for our essential needs. The distribution of steel was a very difficult job, taking into account the needs of export, defence, basic industry, power stations—which the country had to have; it could not get on without them—and transport. The maintenance of the efficiency of our industrial plant was of the utmost importance in a competitive world, and the keeping down of costs depended on three things: hard work, an efficient and understanding management, and up-to-date equipment.

It was natural that the supply industry should want in its buildings to combine efficiency with agreeable architecture, but was it necessary to disguise a power station as a cathedral or for the architects of cathedrals to try to make them look like power stations?

Working with the Trade

He would like to have a free market in materials wherever possible and, where it was not, he wanted always to work with and through the trade. The balance of trade made it impossible to take even slight risks.

So far as price was concerned, it was idle for the Government to ask industry to bring its prices down and to write off stocks bought at high cost unless they practised what they preached. Therefore, with the full assent of the Chancellor of the Exchequer, they were not going to bother about the price which they had paid—incidentally, they had made money on a rising market in the past—but would

follow the market and sell at the market price having regard to replacement cost. The price of tin, lead, zinc and jute had gone down, but the price of copper had gone up. Strictly speaking, the price of copper ought to have followed the American external price, which had been very favourable to us in the past; when £350–£400 was being paid on the Continent, the American external price of 27½ cents meant a price of £220–£230 here. If that price had been followed, the suppliers would have been fully entitled to ask for another £50, following the recent rise of about £50, because the American price had gone to 37½ cents, and one cent meant about £8. The producers in Rhodesia and Canada, however, had agreed most generously not to exact their full bond and until the end of the present month at any rate he could buy their copper not on the basis of 37 cents but at 33 cents.

Gratifying Export Market

Our capacity to buy materials depended on what we could export, and the electrical industry had set a shining example in this respect, in 1951 exporting something like £189 million worth of goods, a 20 per cent increase over 1950; the extent of its exports to Canada, a dollar market and an expanding one, was particularly gratifying.

He had read the President's address and particularly liked Mr. Hunter's references to human relations in industry and the need for the devolution of responsibility. Without such devolution there could not be efficiency, initiative or humanity. The more the men in a works knew about the business, the less they would want to run it, but they were entitled to know what it was doing and be satisfied that it was efficient and that it was human; if it were not human it would not be efficient.

The supreme business of Government to-day was to get the economic life of this country on to a sound basis. We had won the first round by extricating ourselves from a desperate position, but were only at the starting point of the long and arduous road to recovery. We still, however, had tremendous assets of skill and craftsmanship, applied science, a century of experience of world trade and of merchanting, shipping and finance.

The President (Mr. P. V. Hunter), who responded, thanked Lord Swinton for speaking so frankly and sincerely on subjects of such vast importance. When he heard, he said, that a Minister of Materials was to be appointed he was not sure that the Minister would be able to influence those imponderable economic conditions which governed the raw material industries, but he felt that it would be nice to have someone to criticize when things went wrong. After Lord Swinton's speech, however, he felt that the Minister had gained a whole host of thorough-going supporters for his policy.

Sir Henry Self, who proposed the toast of the guests, said that this country had never paid Lord Swinton the tribute due to him for one of the finest pieces of work ever done in public administration, when in the years 1935 to 1938 he, by his personal initiative, drive and vision, laid the foundation for supplies of aircraft, which were then indeed very scarce, and thus ensured that the Battle of Britain was won.

Sir William Walker, who responded, said he did not know how many amenity societies and Societies for the Preservation of Rural England and Friends of the Lake District and the like had the power to come along and say what kind of power station should be put up. They were a thorough nuisance, because of the time they wasted; power stations, which were so badly needed, were held up for months and even years by this sort of opposition.

"Electrical Forum"

An "Electrical Forum" was held on 18th June, when eight questions were answered by a panel whose members were unaware beforehand of the questions to be asked. The President acted as "question master," and the panel consisted of Mr. J. R. Beard (Association of Consulting Engineers), Sir John Dalton (Cable Makers' Association), Sir Vincent de Ferranti (B.E.A.M.A.), Sir John Hacking (B.E.A.) and Messrs. C. T. Melling and S. F. Steward, as chairmen of Area Boards. The questions and a summary of the answers are given below:—

Is it desirable, in the national interests, to have competition between Area Boards, or to have a co-ordinated power supply?

Mr. Melling said the question assumed that the two things were incompatible, but in fact they were not antagonistic. In present conditions it would be wrong to go

back to individual entirely unco-ordinated undertakings. Co-ordination by persuasion was very desirable and was being exercised to a large degree at present, but co-ordination which went further than that would be objectionable. There was also competition, even within Area Boards, between districts, branches and individuals. There was nothing wrong with competition in a generally co-ordinated organization; in fact it was necessary to retain efficiency.

Sir John Dalton suggested that to talk of competition between Area Boards was like organizing an egg and spoon race between elephants. He thought that the Area Boards were far too large and unwieldy. If cut down to manageable size, there could be healthy rivalry between them in consumer service, if not on tariffs.

Mr. Beard expressed the hope that co-ordination between the Area Boards would at least be extended to the standardization of voltage throughout the country.

What are the prospects of exchanging electrical energy with the Continent?

Sir John Hacking said that there were possibilities of doing so with France, where there was a substantial hydro supply and where there might be diversity between the two countries, the peaks not coinciding, so that there could be a pooling of generating plant. The matter had been under discussion with Electricité de France for the last two years or more, and within the next few weeks a decision would probably be taken on whether or not development measures should be put in hand. A fairly detailed scheme had been worked out, but before it could be put into effect a number of technical aspects would have to be investigated. Interconnection with Norway to make use of the hydro resources of that country would probably require d.c. transmission and it was far too early to contemplate such a scheme.

Is restriction of domestic and other uses of electricity, e.g., space heating, necessary in order to provide an adequate supply of power for industry?

Mr. Steward answered this in one word: "No!" He added that the development of domestic supply would probably prove to be essential in order to maintain an adequate and economic supply for industry.

Sir John Hacking agreed. The development of domestic supply on the widest scale, not excluding space heating, was required for its value in creating demand off peak. He denied that it was wasteful of coal to use electricity for space heating. The peak load on the supply industry was usually due to the coincidence of the power load and the lighting load. It was necessary to encourage the development of other loads which were largely taken off peak.

Mr. Beard remarked that it was only things outside the industry's control, forced on it against its will, which brought this question into the picture at all.

With the coming into operation of the "super grid" and the installation of larger generating units in new power stations, should the standard sizes of turbo-alternator sets be fixed at 60 MW and 100 MW?

Sir John Hacking said that it was right to continue the present policy of increasing the average size of unit installed in generating stations. The speed with which that could be done depended on the development of suitable designs by manufacturers and their ability to make these larger sets. It should be only on rare occasions and for special reasons that a set smaller than 60 MW was installed. The B.E.A. was contemplating standards of 100 MW for straight sets and 120 MW for re-heat sets.

Mr. Beard said that the Americans expressed astonishment that with the largest interconnected system in the world we should still be pottering about with 100 MW sets.

Mr. Melling urged that further development of larger sets must not be at the expense of the "bread-and-butter" sets needed to increase generating capacity as quickly as possible.

Sir John Hacking, dealing with the point raised by Mr. Beard, said that it was intended to standardize on a unit boiler arrangement which had many advantages in simplifying design and reducing costs, and at the moment a boiler capable of steaming a 120,000 kW set was about as high as they dared to go with the type of coal available, which was in general inferior to the coal used in American power stations. When experience had been obtained with these big boilers of 840,000 lb/hr it might be found practicable, with certain coals at any rate, to go still higher and if so they would not hesitate to do so.

Sir Vincent de Ferranti did not think

Members of the panel at the "Electrical Forum": Mr. J. R. Beard, Sir John Dalton, Sir Vincent de Ferranti, Mr. P. V. Hunter, Mr. C. T. Melling, Sir John Hacking and Mr. S. F. Steward

that Sir John Hacking intended to blame the manufacturers for not being able to make things as big as they could be made in America, and was sure that it would be wrong to suggest that that was the case. If there was any conservatism it must be on the part of the B.E.A.

Do the panel consider the present form of Consultative Council, and the representation thereon, the most suitable for safeguarding consumers' interests?

Sir Vincent de Ferranti remarked that he had always looked on the Consultative Councils as a mere political sop.

Sir John Dalton thought that possibly the industrial consumer was wasting his time on them and should be given a different form of representation. There was an impression that the representatives of the ordinary consumers were in the pocket of the Area Board and it would probably be better to go back to the old policy of letting the local authorities in the area represent the consumers.

Mr. Steward, while agreeing that the Consultative Councils were not perfect, contended that they were better than anything that had existed before for this purpose. The chairman of the Consultative Council had to represent the consumers effectively on the Board and to ensure that the Board's point of view was properly represented to the consumers.

Mr. Melling said that the Consultative Councils were an experiment, but an experiment which was working well, having regard to the difficulties. There was a big possibility of the movement making good, and something on the same lines, he suggested, could be adopted with advantage in the manufacturing industry.

Mr. Steward suggested that there was a danger, if representation on the Councils was to be by local authorities, of having something between the consumers and the local officers of the Board, which should be avoided. There was already local authority representation on the Councils.

In order to assist our export trade, should not the Central Authority and the electrical manufacturers co-operate to construct transmission lines at 400 kV, a.c. and d.c., so as to gain the necessary operating experience on a commercial basis?

Sir John Dalton said that apart from the export trade the time would probably come when the B.E.A. would be forced to consider importing vast quantities of energy into the London area from outside, probably by d.c. and, he hoped, by cable.

Sir John Hacking observed that there was already a good deal of co-operation between the Authority and manufacturers in these matters. There had been gas turbine developments. The need to import into the London area was visualized in the 275 kV grid plan, where it had been borne in mind that the lines from the East Midland coalfield might in future have to be put up to 380 kV. One difficulty was that with present transmission technique the distribution of voltage across long insulator strings was very uneven, but they had been experimenting with high resistance glazed insulators to overcome this difficulty. The use of ceramic insulators with different permittivities, mentioned by Dr. Vincent the previous day, might prove useful in this respect. They had decided to assume that by the time they wanted to go to 380 kV, seven to ten years hence, insulator technique would have improved sufficiently for them to be able to use a string no longer than that now required for 275 kV, and they were providing increased clearances on the towers for the higher voltage. On d.c. transmission, the E.R.A. had proposals for an expensive trial installation to gain experience, and the B.E.A. was co-operating, but it felt that the likelihood of d.c.

transmission being required in this country was not great, and that the main advantage would be to the manufacturers, who in his view, which was not unchangeable, should bear the lion's share of the cost.

Sir Vincent de Ferranti emphasized that if we were to keep ahead and supply apparatus throughout the world we had to be up to date at home. He was sure that the B.E.A. could be relied upon to co-operate in keeping this country in the forefront of technical development.

Is it in the public interest that industry should co-ordinate its efforts through trade associations?

Sir Vincent de Ferranti said that the answer was given by comparing the position of the British electrical manufacturing industry in the world to-day with the pitiable condition that it was in before B.E.A.M.A. started in 1910.

Sir John Dalton contended that it must be in the public interest that groups of manufacturers or traders should get together to regulate the quality of their products, to embark on co-operative research and to exchange patents and "know-how," schemes for good labour relations, etc.

Mr. Melling agreed that in general it was in the national interest that there should be trade associations, but suggested that some provision should be made for customer representation, as was secured by the Consultative Councils.

Sir John Hacking asked whether the argument for trade associations was not made stronger by the existence in this country of too many manufacturers making the same type of equipment. He pointed out that in the United States there were in effect only three turbo-alternator manufacturers and only three or four manufacturers of large boilers, in spite of the much greater size of the internal market.

The President pointed out that trade associations were prohibited by law in the United States, and said that the concentration of American industry in the hands of a small number of large undertakings had been conditioned by the fact that with cut-throat competition it was the smaller man who was killed.

Mr. Steward mentioned that Sir John Dalton, in listing the duties of trade associations, had not mentioned price fixing. It was right that there should be an orderly price structure, but it should be related to the costs of the most efficient firms.

What are the prospects of the use of nuclear energy in the electricity supply industry?

Sir John Hacking said that a certain amount of collaboration was taking place between the B.E.A. and the research establishment at Harwell on this matter and as a result there should be a prospect of a nuclear energy station of reasonable capacity within ten years, but he could make no definite prophecy. He looked on nuclear energy as affording a possible supplement to our coal supply and not as replacing it.

The meeting closed with a vote of thanks to the panel proposed by Mr. H. Nimmo (E.D.A.), who hoped that a similar forum would be held at future Conventions.

Annual General Meeting

The Convention concluded with the annual general meeting, on Wednesday, 18th June. The report of the Council and the accounts were adopted without discussion, but Mr. R. Birt referred to the

Members of the Convention Council

The platform at the annual general meeting

curtailment of the usual period of the Convention, and quoted a recent editorial in the technical Press which stated that a national event of the kind in question was worth more than two and a half days, and Sir John Dalton's view, expressed in an article,* that " Possibly nobody will thank us for this gesture, and other conventions do not appear to be following our example." He urged the Council to obtain the views of the meeting on reverting to a normal period for the Convention in 1953.

Mr. Birt's remarks were greeted with applause, and the President said he felt sure the new Council would welcome an expression of opinion.

Mr. Bennett supported the suggestion made by Mr. Birt, if only out of courtesy to the authors of papers, who must have spent many weeks on preparing them, only to have their discussion confined to a little over a quarter of an hour. The papers presented had been magnificent and deserved better treatment.

The President asked whether it was the general view that, without criticizing the decision taken in the special circumstances of the present year, it would be better to revert to something approximating to the arrangements made in earlier years. Delegates indicated by their applause that this was their view, and the President said that the new Council would welcome that expression of opinion. The list of nominations to the new Council was taken as read, and the auditors were re-elected.

The President reported that the Council unanimously recommended that Sir John Hacking, President of the I.E.E., be elected President of the Convention for the ensuing year. The recommendation was carried by acclamation and briefly acknowledged by Sir John Hacking.

The President also reported that the

* *Electrical Review*, 13th June.

Sir John Hacking, the new President of the Convention, Mr. J. R. Beard, Vice-President, and Mr. E. A. Mills

Council unanimously recommended that Mr. J. R. Beard, C.B.E., be elected Vice-President, and this proposal was also carried by acclamation. Mr. Beard, in responding, paid a tribute to the forethought and initiative of Lord Citrine, who had brought together within one convention all sides of the electrical power industry.

A vote of thanks to the Mayor and Mayoress of Bournemouth was carried by acclamation.

The meeting accepted the Council's recommendation that the Convention next year should be held in Torquay in the week commencing 8th June.

Mr. E. A. Mills proposed a vote of thanks to Mr. P. V. Hunter, the retiring President, for his services to the Convention during the past year, coupling with it an expression of thanks to Mrs. Hunter. The vote of thanks was carried by acclamation and, having been briefly acknowledged by Mr. Hunter, the meeting terminated.

Generating Plant Programme

Lord Citrine's Review

A CONFERENCE of members and employees of the British Electricity Authority and Electricity Boards was held at Bournemouth on 18th June. Lord Citrine, Chairman of the B.E.A., addressing the meeting, said that in its fourth year of working the Authority, by increased generation efficiency, had saved 790,000 tons of coal, representing a financial economy of about £2¼ million.

Referring to the commissioning of 1,113 MW (sent out) of new plant in 1951, he said that highly creditable to all concerned as this was, it was still much below requirements. For the year 1952, the minimum and maximum figures of new plant commissioning likely to be achieved were 1,150 MW and 1,400 MW. These would steadily rise in subsequent years and for 1957 should attain figures of 1,700 and 1,900 MW. To achieve this it was necessary to place orders from three to five years ahead and in order to achieve the upper figure a target figure much in excess of the estimated maximum had to be aimed at.

The trouble was to persuade the Government that the rate of production must be expanded still further in succeeding years and approval must be given at once because they were already behind the date when firm allocations of orders should be made. The present limitation was to the figure of 1,550 MW. This limit must be appreciably raised in order to meet the steady growth of load while overtaking arrears before they could even start to replace obsolete plant.

With a view both to speedier construction and economy in the building of power stations, Lord Citrine stated that an intensive study had been made of the use of steel and building materials. A semi-outdoor form of construction was being embarked upon at the new Ince station, and investigations were proceeding into the possibility of applying this principle to other stations.

The effort made to reduce the size of the buildings, he said, was helped by the adoption of large capacity units. The bulk of the plant in the current building programmes consisted of 30 and 60 MW machines. The standards for the future were likely to be 60 and 120 MW sets supplied by unit boilers.

Lord Citrine and representatives of the electricity supply industry at the B.E.A. meeting at Bournemouth last week

IN THE COURTS

Employers and Safe System of Working

An employer's liability to provide a safe system of working was considered recently in two cases in the High Court.

On 12th June, in *Ball* v. *Hawker Aircraft, Ltd.*, Mr. Justice Lynskey held that where a fitter who was working on the interior of the fuselage of a Hawker "Fury" aircraft, fell and injured himself when moving from the front to the rear cockpit, he could not allege that the system was unsafe merely because he was expected to use a retractable footstep, built into the aircraft for the use of pilots, instead of a separate trestle standing on the ground. The employer's duty, which was not a general one but was owed to a particular employee and arose out of the contract of service, was to use reasonable care to have the premises safe, having regard to all the circumstances, including the experience, habits and customs of the individual. What was safe for one might not be safe for another.

In *Heath* v. *George Gadd & Co., Ltd.*, on 13th June, the Court of Appeal considered the safe use of a machine for punching metal sections. When round sections were being processed grease had to be applied in a certain way, but for tee sections a different method was used. Mr. Heath, who had received injuries to his hand due to the greasing rod he was holding being drawn into the machine when putting tee sections through, alleged an unsafe system. The evidence showed that he had never previously dealt with any but round sections, and so the foreman had instructed him in the different greasing procedure. Despite these instructions, he had used the old method.

Lord Justice Singleton found that the use of the wrong procedure was the cause of the accident and that the system was not unsafe. An employer's duty is discharged by the exercise of due skill and care on his part and, in this case, that duty had been discharged by the foreman giving proper instruction to the plaintiff. Employees must take reasonable care for their own safety, and the employer is not to be regarded as an insurer.

Breach of Factories Act

On 13th June Mr. Justice Donovan, in *South* v. *British Feeding Meals and Milk Products Co., Ltd.*, awarded the plaintiff, an oiler and greaser employed by the defendants, total damages of £1,625 for injuries received when his arm was caught in transmission machinery in circumstances which showed a breach of section 16 of the Factories Act, 1937.

Mr. South, in order to obtain access to a particular greasing point, removed a guard and stood between two closely adjacent moving belts whilst the machinery was in motion. His sleeve was caught by one of the belts and his arm dragged between the belt and the pulley. He had chosen not to use an alternative approach, which would not have entailed the removal of a guard, because that would have brought him into close proximity to some unguarded, but slow moving, bevel gears.

Employees were expressly forbidden to clean machinery whilst in motion, but nothing was said about greasing. The plaintiff alleged, and it was supported by evidence, that he had been told that greasing was only effective if done with the machinery in motion; he was never told not to do so. Though he was not actually instructed to remove guards, he was given the answer "Take off the guard" when he asked how he was to get at this particular point.

The Judge held that the defendants were in breach of section 16 of the Act in that the guard was not maintained constantly in position whilst the machinery was in motion, the lubrication not having been shown to have been "immediately necessary." The plaintiff had, however, contributed to his injury to the extent of one-sixth of the damages by wilfully endangering himself, contrary to section 119 (2).

Injured Electrician's Claim Fails

In the Queen's Bench Division on 17th June in *Arnold* v. *Austin Bros. Electrical Co., Ltd., and S. H. Johnson & Co., Ltd.*, Mr. Justice McNair dismissed a claim in damages for personal injuries alleged to have been received as a result of shock from a portable electric drill.

Mr. Arnold, an electrician employed by the first defendants, was engaged on installation work in an extension to the second defendants' factory. At the time of the accident he was standing at the top of a builder's trestle in order to drill a hole in a steel joist with an electric drill. He alleged that on pressing the trigger switch he received a shock which caused him to fall and injure his left foot. The drill had been borrowed by him from the second defendants. He sued his employers in negligence for failing to provide a drill in circumstances which compelled him to borrow from the second defendants, and the latter, as occupiers, for negligence and breach of the Electricity (Factories Act) Special Regulations, 1908 and 1944, in that the drill was defective and not properly earthed.

Independent expert evidence showed that there was no fault in the drill or the lead and no lack of earth continuity. Evidence was also given by the manufacturers' tester as to the standard tests applied to all drills, but he failed

to recollect actually examining or testing this particular drill, returned to the manufacturers after the accident.

It transpired during the plaintiff's cross-examination that he had erected a temporary lighting point for the builders, run in v.i.r. cable with a brass e.s. holder, on the joist on which he was working. Mr. John Thompson, counsel for Johnson's, suggested (but did not press the point) that the joist might have been rendered live by contact with the exposed portion of the lamp cap, supposing the holder to have been connected the wrong way round, and that the plaintiff had received a shock by completing the circuit from the joist to the earthed drill casing.

The Judge held that, unless the plaintiff clearly established that he had suffered an electric shock, he had no claim against either defendant. He was satisfied that the plaintiff had used the drill in question previously to the accident and that it had then worked satisfactorily. The history of the drill convinced him that it was impossible that a shock could have been received from it, and therefore the claim failed.

Sub-Contractors on Building Sites

Some points of interest to electrical contractors working on building sites were raised in *Vaughan* v. *Building Estates, Ltd.*, heard in the High Court on 19th and 20th June. Mr. Vaughan, a working sub-contractor for brickwork, sued the defendants, main building contractors on a housing estate, for damages for injuries received when he fell over a scaffold board on the site and broke his ankle.

The evidence showed that, in order to get from one part of the site to another, it was Mr. Vaughan's habit, as it was also of the main contractors' men, to take short cuts over rough ground instead of going round by established roads or paths. It was while taking such a short cut that Mr. Vaughan was injured, and he alleged that it was impossible to see the scaffold board because of long grass.

Part of the claim was that Reg. 5 of the Building Regulations, 1948, had not been complied with, in that a safe means of access had not been provided. This was not proceeded with, but Mr. Justice McNair considered that Reg. 4 (i) would in any event dispose of it. It was further claimed that it was an implied term of the contract that the building site should be reasonably safe. The Judge would not accept that such an obligation applied here, for it was not necessary for the performance of his contractual duties that the plaintiff should take this particular route.

Finally, it was advanced that the defendants owed a duty of care to the plaintiff as an invitee. The Judge stated that, though the duty was to give fair warning of unusual danger, the invitee must show reasonable care for his own safety. It was usual to find such things as bricks and boards lying about building sites, and they were not unusual dangers. The scaffold board was something the plaintiff might expect to find, and because of that he had no claim.

I.E.E. Western Centre

Summer Meeting in Central Wales

MEMBERS of the Western Centre of the Institution of Electrical Engineers recently foregathered at the Abernant Lake Hotel, Central Wales, for their week-end summer meeting.

It has been customary to have this yearly event at some point of advantage where members and their families are able to meet for the purposes of social gathering and entertainment. Over 90 members, their wives and friends took advantage of the arrangements that had been made and the meeting was voted by all as the "best ever." The following programme was prepared by the Committee over which Mr. J. W. Elliott, chairman of the Centre, presided with Mr. J. Vaughan Harries as organizing secretary.

On the Friday the party assembled at the Abernant Lake Hotel in time for tea. In the evening there was an informal dinner followed by dancing and indoor games.

On the Saturday morning a very entertaining golf competition was arranged for the ladies and was particularly designed for those who had never played golf before. The competition was run on truly "nationalized lines" and each competitor received the assistance of a caddie, a technical adviser and a welfare officer. The afternoon was taken up by a motor rally, and in the evening a formal dinner was held, followed by a dance.

On the Sunday morning there was a golf competition for men only. The afternoon was free for members to do as they pleased. After dinner on Sunday evening the usual "family gathering" was held and much good humoured entertainment was provided for all.

Cambridge University Engineers

THE Cambridge University Engineers' Association was founded in 1929. After a period of inaction it has been revived and all former Cambridge graduates in engineering are invited to apply for particulars of the Association's activities to the hon. secretary at the University of Cambridge Department of Engineering, Engineering Laboratory, Trumpington Street, Cambridge. Apart from compiling a register showing the present whereabouts of its members, the Association circulates a periodical bulletin giving information about the progress of the Engineering School and the researches in progress there. It also holds a reunion in Cambridge each July.

Commerce and Industry

Copper Price Statement

Great Britain and the South African Market

The Ministry of Materials announces the completion of negotiations with its main suppliers on the price of copper. The quotation for copper in the New York *Engineering and Mining Journal* is the basis on which the Ministry pays for the copper it buys under its contracts. Recent developments, however, forced this quotation up to a level which the Ministry regarded as unrepresentative of the market. Negotiations were therefore opened with the suppliers to fix an alternative basis of pricing. It has been agreed that as from 12th June to the end of the month copper sold to the Ministry on the basis of the June price shall be valued at 33 cents/lb instead of the higher *E.M.J.* quotation. This enables the Ministry to maintain its price of £281 a ton, announced on 14th June.

During the past 18 months, consumers in the United Kingdom have been obtaining copper at prices much lower than the prices their Continental competitors have had to pay, because contracts with Rhodesian and Canadian suppliers were based on the *E.M.J.* price. These suppliers would have been entitled to claim the current *E.M.J.* price for current supplies. They have agreed to treat the present fluctuations of the market as exceptional and transitional and to accept a lower price than that to which they would have been legally entitled during the present period of uncertainty.

It is hoped that the copper market will settle down shortly and steady trading in copper will be resumed throughout the world. In that event the *Engineering and Mining Journal* quotation will resume its position as the best available measure of the world price in the absence of a freely operating market. For about a fortnight the Ministry sold copper at £231 a ton while its buying prices were much higher. Losses incurred in these sales will have to be recovered during the current financial year and the Ministry's new selling price includes an item of £5 per ton on that account. There is an additional £1 to cover increases in freight, refining, interest on capital employed, cost of delivery to consumers' works, etc.

The present Ministry selling price of £281 per ton may be regarded as stable at least until the end of June. Arrangements will shortly be made with suppliers for July pricing. The conditions under which forward sales for August will be made are being considered.

Coventry Contractors' Showrooms

One of the oldest electrical contracting firms in the Midlands, G. R. Marson, Ltd., founded in 1893, have recently made extensive alterations and additions to their premises in Queen Victoria Road, Coventry. By acquiring adjoining premises, building over a roadway and erecting offices on the first floor, the whole of the front portion of the premises totalling about 1,200 sq ft can now be used as showrooms. The moving of the offices to the first floor has also made additional storeroom and workshop space available on the ground floor.

The attractive layout of the showrooms provides for the display of radio and television apparatus at one end, the adjoining section

A portion of G. R. Marson's new showrooms at Coventry

Flameproof equipment display at the London showrooms of the Simplex Electric Co., Ltd.

accommodating examples of cookers, washing machines, vacuum cleaners, floor polishers and floor standards. In the central portion there are further washing machines and vacuum cleaners, together with smaller appliances such as clocks, ironers, fires, irons, toasters and blankets. The rest of the showrooms houses refrigerators, cookers (including Canadian types), kettles and lighting fittings. A special feature of the scheme is the facilities for demonstrating different lighting effects such as indirect, cornice, laylighting, etc. Leading from the showrooms is a small reception room, which is found useful for discussing customers' problems, signing hire-purchase agreements, etc.

Royal Commercial Travellers' Schools

The board of management of the Royal Commercial Travellers' Schools, Hatch End, Pinner, Middlesex, announces that Her Majesty the Queen has been graciously pleased to grant her patronage to the Schools.

The Yearly Court of Governors of the Schools was held on 13th June last, at St. Ermins, S.W.1, when the Schools' president, Mr. Leslie Gamage (General Electric Co., Ltd.), presided. Speaking upon the report of the board of management and statement of accounts, which were adopted, Mr. Gamage mentioned the need for more support in view of the rising costs of upkeep and additional expenses being incurred in carrying out the rebuilding programme at the Schools. A vote of thanks proposed by Mr. J. Freeman Dunn, chairman of the board, was accorded to Mr. Gamage, pleasing reference being made to the invaluable services and generosity of both Mr. Gamage and the Hon. Mrs. Gamage.

Flameproof Switchgear Display

The accompanying picture shows a new flameproof equipment display which is now on view at the Tottenham Court Road, London, showrooms of the Simplex Electric Co., Ltd.

This display includes a miniature switchfuse panel, switch socket and plug, switch-fuses and a top entry conduit lantern. The large mural pictures with this display show well known oil refineries at which the company's flameproof equipment has been specified.

Equipment for Yemen

Wireless equipment of British design and manufacture will give the Kingdom of Yemen—74,000 sq mile territory on the eastern shore of the Red Sea—a basis for its first permanent internal and external communication system. An order for the equipment has been placed with Marconi's Wireless Telegraph Co., Ltd., by His Majesty the Imam. The main installations will be at Taiz, an inland town, and at Hodeida on the coast. A 100 W "Oceanspan" transmitter at Hodeida will permit constant communication with shipping passing through the Red Sea to and from Suez. Also at Hodeida will be two all-frequency receivers for incoming messages from other countries. At Taiz, Marconi's have already installed a 200 W transmitter and this equipment will be augmented with two receivers of the same type as will be installed at Hodeida. A high frequency receiver is to be installed for the commencement of an internal communications system, and two 100 W high frequency transmitters will be placed at other centres to provide subsidiary internal services. It is expected that installation will be completed in the late autumn.

Heenan & Froude Jubilee

The golden jubilee of the incorporation of Heenan & Froude, Ltd., as a public company is celebrated this year, and at the invitation of the company, a Press visit was paid to its works at Worcester on 16th June, and to the works of Fielding & Platt, Ltd. (a member of the Heenan & Froude group) at Gloucester the following day. The works at Worcester now cover eight acres and employ 1,100 people. The products include refuse disposal plant, baling presses, engine test plant, water and air coolers, variable-speed controlled-slip couplings, automatic machines for the wire, strip and chain industries, locomotive valve gear (manufactured on behalf of the subsidiary Associated Locomotive Equipment, Ltd.), and specialized engineering products for Government Departments.

The party made an extensive tour of the

various sections of the works, including the electrical and electronics shops, the research department, the high speed test bed for testing dynamometers up to 45,000 r.p.m. and the municipal engineering division which is devoted mainly to the design, manufacture and installation of all classes of equipment to handle and dispose of household, trades, institutional and industrial refuse.

At the works of Fielding & Platt, Ltd., the party was shown over the various departments engaged in the production of hydraulic presses and hydraulic equipment for many applications, particularly in the aeronautical, automobile, electrical, armament, municipal, shipbuilding and general engineering industries. These works cover 3½ acres and employ 650 workpeople.

New Broadcasting Company

It is reported that a new company is about to be formed with the object of entering the field of television and sound broadcasting throughout the world, and in this country when it is eventually permitted. The first directors will be Sir Alexander Aikman (chairman of Electric & Musical Industries), Mr. N. Collins (chairman of High-Definition Films), Viscount Duncannon, Sir Alexander Korda, Sir Robert Renwick (director, Associated Electrical Industries, Ltd.), and Mr. C. O. Stanley (chairman of Pye, Ltd.).

According to the *Financial Times* Mr. N. Collins stated last week that so far as private enterprise T.V. broadcasting in this country was concerned, the establishment of the company was mainly an effort to have the organization and resources ready for when it should be permitted. The bringing together of Pye and Electric & Musical Industries and Sir Alexander Korda would establish in this country the first centre of T.V. information on technical development, broadcasting and programmes. Further details of the company, its name, initial capital and registration, will be announced shortly.

Exide Convention

The annual Exide Service Agents' Convention opened at Bournemouth on 10th June with an informal reception and dance. The following morning, after a civic welcome from the Mayor of Bournemouth, Ald. H. A. Benwell, and Mr. H. V. Schofield's opening speech, the first of three business sessions was held at which the year's activities were reviewed and discussed and plans formulated for the future. Papers were read on various technical, financial, sales and publicity matters. On Wednesday afternoon the majority of the visitors were guests of the Mayor and Corporation of Bournemouth on an afternoon cruise along the Dorset coast. The strong golfing contingent meanwhile was competing on the Parkstone course for the various Exide and Drydex trophies. In the evening an official dinner and dance was held in the Pavilion Ballroom. Thursday afternoon, after the second business session, was left free for the inspection by delegates of the full-scale Exide publicity and service exhibition erected at the rear of the sessions room. The traditional climax to the Convention came in the evening with the annual Exide banquet, ball and cabaret attended by over 670 guests. The banquet was presided over by the chairman of the company, Mr. A. W. Browne, who proposed the toast of the Mayor and Corporation of Bournemouth, to which Ald. Benwell replied. The response to the toast of the visitors and the Press, proposed by Mr. Schofield, was made by Colonel A. M. Wilkinson. The toast of the Exide service agent was made by Mr. E. Powell, sales manager, whose appointment, with that of Mr. C. Pritchett, commercial manager, to the board of directors had been announced earlier in the Convention. In reply, Councillor Mrs. M. E. Walters, of Walters & Co. (Parkstone), Ltd., replied.

Lanterns for Manchester University

Two bracket lanterns, made in black iron and amber cathedral obscured glass, have been constructed by the General Electric Co., Ltd., for the illumination of the main staircase and the

Bracket lanterns illuminating the main staircase of Manchester University

lower hall of Manchester University. Each lantern houses eight 3ft 30 W "Osram" natural fluorescent lamps, four 60 W "Silverlight" lamps in the top panels and one 100 W "Silverlight" lamp in the base. To provide upward illumination for the high vaulted roof, a "Gecoray" 200 W floodlight has been installed in the top of each lantern.

Two smaller, similar lanterns illuminate the top of the staircase, while the lower hall is lighted by three pendant copper lanterns finished dead black, each lantern housing a 300 W clear lamp. Here satin glass with a clear bevelled edge has been employed.

Contract Price Formulæ

The British Electrical and Allied Manufacturers' Association has issued the June figures for its contract price adjustment formulæ. In each case the rate of pay for adult male labour at 14th June is deemed to be 134s. The "cost of material" figures are as follows:—

For electrical machinery and equipment: The Board of Trade index figure published on 14th June is 165·5.

For turbo-generating and allied plant: Materials used in mechanical engineering industries, 151·7; blast furnaces and iron and steel melting and rolling (40 and 41), 142·6; price of ⅜in o/d 18 s.w.g. brass condenser tubes (*Metal Bulletin*, 13th June), 3s 5¾d.

Outstanding contracts covered by the Board of Trade intermediate products index: The index figure for intermediate products (14th June) is 366·9.

Radio Gramophone Development Co.

An announcement was made in August, 1951, that the Radio Gramophone Development Co., Ltd., was to become a wholly-owned subsidiary of the Automatic Telephone & Electric Co., Ltd., to be employed principally in meeting defence requirements in respect of radio and associated equipment. With this in view, the Automatic Telephone & Electric Co., Ltd., proposes to continue operations at the existing Bridgnorth factory and as from 18th June has been conducting these operations under the new name of A. T. & E. (Bridgnorth), Ltd., formerly known as the Radio Gramophone Development Co., Ltd. That part of the assets of the Radio Gramophone Development Co., Ltd., which comprises the manufacture and sale of domestic radio, radiograms and television receivers hitherto carried on at Bridgnorth, including the patents, trade marks and goodwill, has been assigned to Mr. William Harries on behalf of a new company called the Radio Gramophone Development Co., Ltd., with head office at 3 and 4, Hampton Court Parade, East Molesey, Surrey, which has acquired the stocks of the former Radio Gramophone Development Co., Ltd., relating to domestic radio, radiograms and television receivers, and has taken over the service arrangements.

South African Warning

According to a *Reuter* message from Cape Town, Mr. Sauer, the Minister of Transport, speaking in the House of Assembly on 18th June, said that if British manufacturers wanted to keep their markets in South Africa they must carry out promises of delivery. South Africa had placed orders in other overseas countries, including Germany, Belgium, the United States and Switzerland, and had not experienced delays in execution of orders from them. Examples of delayed deliveries from Great Britain which he cited included several electrical equipment orders.

Fatigue Testing Laboratory

On Monday last, 23rd June, Lord Woolton opened the new £40,000 fatigue testing laboratory of the British Welding Research Association at Abington Hall, Abington, near Cambridge. The Association has extensive research in progress on fatigue strength, which when concluded, must have a vital influence on the strength and economy of welded structures. Until recently this research has been conducted by the resonance method, with its limitations, and the work has been carried out in temporary huts.

The laboratory, with its office

New fatigue testing laboratory of the British Welding Research Association

accommodation, has a floor area of 5,000 sq ft and houses a 100 ton Losenhausen fatigue testing machine together with other fatigue testing equipment and a 50 ton Denison universal testing machine. There is also a Werner and Pfleiderer pulsating pressure plant for submitting vessels to pulsating pressures up to 6,000 lb/sq in at 100 cycles/min.

Prices of Materials

In the accompanying table we give the prices of the more important materials used in the electrical industry. The figures are those quoted on Monday last.

ALUMINIUM Ingots	ton £154 0s 0d
COPPER, H.C. Electro	ton £281 0s 0d
Fire Refined 99·70 per cent ..	ton £278 10s 0d
Fire Refined 99·50 per cent ..	ton £278 0s 0d
COPPER Tubes	lb 2s 8d
Sheet	ton £335 0s 0d
H.C. wire and strip	ton £313 10s 0d
LEAD, English	ton £134 10s 0d
Foreign	ton £133 0s 0d
MERCURY	flask £73 10s 0d
TIN	ton £963 0s 0d
ZINC, G.O.B. Foreign	ton £130 0s 0d
Electrolytic	ton £134 0s 0d
BRASS Tubes	lb 2s 3½d
Sheet	lb 2s 6½d
Wire	lb 2s 9½d
PHOSPHOR BRONZE	
Wire	lb 3s 8½d
RUBBER, No. 1 R.S.S. spot ..	lb 27½d-28½d

Non-Ferrous Metals

The Ministry of Materials announces that from 20th June the price of good ordinary brand zinc has been reduced from £138 to £130 per ton delivered consumers' works. Premiums for higher grades remain unchanged. The Ministry of Supply has freed secondary zinc, zinc alloys, zinc scrap and gunmetal scrap from price control.

The price of good ordinary brand foreign lead has been increased by £4 to £133 a ton as from Tuesday last, following a rise in the United States.

Refrigerator Price Reduction

Increased production from a new refrigerator works, augmenting the effort of its Wembley works, has enabled the General Electric Co., Ltd., to announce an overall reduction in price and purchase tax for its 5·3 cu ft refrigerator from £135 5s 7d to £127 2s 5d.

Johnson, Matthey (South Africa)

It is announced by Johnson, Matthey & Co., Ltd., that it is proposed to form a subsidiary company in South Africa under the title of Johnson, Matthey & Co. (South Africa), Ltd., with offices in Johannesburg. The initial objectives will be to meet from local production the industrial needs of South Africa for noble metals, and to manufacture the requirements of the jewellery, dental and allied trades. Mr. J. A. Shaw, hitherto assistant manager of the Shepherd's Bush works, London, has been appointed manager and will leave for South Africa in September, together with Mr. E. C. Deering, a director of the London company.

Trade Announcements

The **Spurvic Manufacturing Co.** has moved to larger premises at Glastonbury where it will continue the production of the 3, 6 and 25 kVA diesel generating sets. A special department will undertake engine overhauls. Administration will remain at 47, Victoria Street, London, S.W.1.

Messrs. S. I. Engel inform us that they have been appointed sole concessionaires of the universal pencil elements covered by patent No. 564768.

Catalogues and Lists

General Electric Co., Ltd., Magnet House, Kingsway, London, W.C.2.—Illustrated priced catalogues of lighting fittings (F.1705) and lighting fittings in "Chrysaline" (F.1695). Illustrated folder on horizontal batch type electric furnaces (PH.1606).

Franco-British Electrical Co., Ltd., 15-17, King Street, St. James's, London, S.W.1.—Illustrated leaflet on the new "Luxolite" L.117 fluorescent lighting unit incorporating translucent sides.

Keith Blackman, Ltd., Mill Mead Road, Tottenham, London, N.17.—Up-to-date edition of publication No. 22 giving details of the "Weldafume" unit.

Visco Engineering Co., Ltd., Stafford Road, Croydon, Surrey.—Illustrated pamphlet on "Visco" industrial ventilation and air conditioning (523).

Bakelite, Ltd., 18, Grosvenor Gardens, London, S.W.1.—Illustrated catalogue of Bakelite, Warerite and Vybak plastics.

Tool Treatments (Chemicals), Ltd., Colliery Road, Birmingham Road, West Bromwich.—Illustrated folder describing the "Chemical Black" process as a finish for steel articles.

Siemens & General Electric Railway Signal Co., Ltd., East Lane, Wembley, Middlesex.—Illustrated booklet on the subject of pedestrian crossings and pedestrian actuated traffic control.

Griffin & Tatlock, Ltd., Kemble Street, Kingsway, London, W.C.2.—Illustrated 64-page catalogue of laboratory equipment with index (16B-S).

I.E.E. PREMIUMS

Awards for 1951–52

THE Council of the Institution of Electrical Engineers has made the following award of Premiums for papers read or accepted for publication during the 1951–52 session:—

Group A.—*Institution Premium:* D. P. Sayers, B.Sc., J. S. Forrest, M.A., D.Sc., and F. J. Lane, O.B.E., M.Sc. *Kelvin Premium:* A. L. Cullen, Ph.D., B.Sc.(Eng.). *John Hopkinson Premium:* T. H. Flowers, M.B.E., B.Sc.

Group B (*Non-Section Premiums*).—*Llewellyn B. Atkinson Premium:* H. L. Haslegrave, M.A., Ph.D., M.Sc.(Eng.), Wh.Sch. *Extra Premiums:* J. E. Flood, B.Sc.(Eng.) and J. R. Tillman, Ph.D.; and P. R. Howard, B.Sc.(Eng.).

Measurements Section.—*Silvanus Thompson Premium:* Professor F. C. Williams, O.B.E., D.Sc., D.Phil., F.R.S., T. Kilburn, M.A., Ph.D., G. E. Thomas, M.Sc., and A. A. Robinson, M.A., Ph.D. *Mather Premium:* D. F. Lawden, M.A. *Extra Premium:* J. V. L. Parry, M.Sc.

Radio Section.—*Duddell Premium:* R. N. Bracewell, B.Sc., M.E., Ph.D., K. G. Budden, M.A., Ph.D., J. A. Ratcliffe, O.B.E., M.A., F.R.S., T. W. Straker, Ph.D., and K. Weekes, M.A., Ph.D. *Ambrose Fleming Premium:* T. Kilvington, B.Sc.(Eng.), F. J. M. Laver and H. Stanesby. *Extra Premiums:* A. T. Starr, M.A., Ph.D., T. H. Walker, B.Sc.Tech., H. Grayson, B.Sc.Tech., T. S. McLeod, M.A., R. A. G. Dunkley, B.Sc., G. Dawson, B.Sc., G. King, B.Sc., L. Lewin, J. Lipinski and [illegible]. B. Setchfield; G. H. Metson, M.C., Ph.D., [illegible].Sc., S. Wagener, Dr.Phil., M. F. Holmes, B.Sc., and M. R. Child; A. R. Boothroyd, B.Sc.; [illegible]. C. Cherry, M.Sc.; W. J. Gray, M.Sc.(Eng.); G. Millington, M.A., B.Sc.

Supply Section.—*Sebastian de Ferranti Premium:* E. M. Johnson, M.Sc.Tech., and C. P. Holder, B.A. *John Snell Premium:* H. von Bertele, Dr.Ing., Dipl.Ing., and R. Tucker. *Extra Premium:* H. Chilton, B.Sc.

Utilization Section.—*Crompton Premium:* J. C. Macfarlane, O.B.E., Wh.Sch., J. W. Macfarlane, Ph.D., Wh.Sc., and W. I. Macfarlane, B.Sc., Wh.Sc. *Swan Premium:* P. Bingley. *Extra Premium:* A. T. Robertson.

Group C.—*Fahie Premium:* J. Bell, M.Sc., J. A. B. Davison, M.A., and E. T. A. Phillips. *Heaviside Premium:* P. M. Woodward, B.A., and I. L. Davies, M.A. *Webber Premium:* R. H. J. Cary. *Overseas Premium for Senior Members:* G. Fuchs, Dipl.Ing. (Paris). *Willans Premium:* A. R. Cooper. *Students' Premiums:* G. Campbell, B.Sc.(Eng.); D. B. Johnston, B.Sc.(Eng.), and D. J. Kingsbury, B.Sc.; G. P. Cundall, B.Sc.; A. S. Denholm, B.Sc.; P. A. L. Ham and M. J. Beer; D. J. Harris, B.Sc.(Eng.) and R. J. Ryan, B.Sc.(Eng.); J. T. Machowicz, B.Sc.; N. G. Meadows; P. N. Prior, B.Sc.(Eng.); and A. J. Walsh.

World Power Conference

AT the recently held annual general meeting of the British National Committee of the World Power Conference Sir John Hacking (B.E.A.) was elected to succeed Mr. Harold Hobson as vice-chairman and Mr. F. G. Brewer (secretary, The Gas Council) was elected honorary treasurer to succeed Col. C. M. Croft, who did not offer themselves for re-election. Sir Vincent de Ferranti is chairman and Dr. A. Parker is honorary secretary of that Committee. The members of the Executive Committee are the four officers, Prof. F. H. Garner, Sir William Halcrow, Messrs. Harold Hobson, Henry F. H. Jones, B. L. Metcalf and J. A. Oriel.

The next sectional meeting of the W.P.C. will be at Rio de Janeiro from 25th July to 8th August, 1954, and preparations for British participation have already begun. A Papers Committee has already been appointed under the chairmanship of Sir John Hacking. The technical programme of the meeting is given as appendix B to the annual report of the World Power Conference, which is obtainable from 201, Grand Buildings, Trafalgar Square, London, W.C.2.

The International Executive Council of the W.P.C. will meet this year at Chicago on 4th September by invitation of the U.S. National Committee and of the "Centennial of Engineering Convocation, 1952," which is being organized by the American Society of Civil Engineers in association with other American engineering institutions. The United Kingdom participants are expected to be Sir Vincent de Ferranti, Sir John Hacking, Dr. A. Parker, Sir William Halcrow and Mr. C. H. Gray, secretary to the W.P.C. Council.

The new edition of the W.P.C. central office publication entitled "National Committees and Representatives" is expected to be published this month or next.

ELECTRICITY SUPPLY

Bath Overhead Lines Inquiry

U.S. Senate Defers St. Lawrence Seaway Bill

A MINISTRY of Fuel and Power inquiry was held at Bath last week into plans of the South Western Electricity Board to use overhead lines to supply three sites in the city, namely, from Locksbrook Road to cottages on the Island at Weston; to a caravan site at Quarry Farm, Claverton; and to a private enterprise housing estate at Bradford Road. The Corporation had refused planning permission for the erection of these lines and the Board had appealed against the decision.

Mr. R. Hiles, deputy town clerk, said that the Corporation's objection in all these cases was on a matter of principle. Bath was a spa city of great natural beauty, historical interest and architectural reputation. Large numbers of visitors were attracted by the many amenities which the city had to offer. When Bath owned the electricity undertaking the principle was carried out to the letter. He agreed with the Electricity Board that the Locksbrook site was predominantly industrial but maintained that it was clean industry in an area of many pleasant vistas. He also agreed that the cottages which were to be supplied with electricity were scheduled for demolition in a few years' time.

Mr. G. Marsh (South Western Electricity Board) said that not all of Bath had architectural beauty. He was sure visitors would not come to look at the caravan site at Claverton. For the cottages on the Island of Weston it might well be an overhead line or nothing. At Claverton an underground cable would be taken as far as the proposed building sites. It was the Board's intention to extend the line overhead to the site for 28 " more or less permanent " caravans.

The Ministry inspector (Mr. H. W. Grimmitt) afterwards visited the three sites.

House Wiring Plans

Owing to a slight relaxation of the restrictions on capital expenditure, the North Eastern Electricity Board is to begin laying cables to supply electricity to over 800 Council houses at Blyth (Northumberland) built before the war and at present served only by gas. The Council will carry out the wiring of the houses and lay the cables to connect to the Board's supply.

Members of the Newcastle-upon-Tyne City Council are trying to speed up the supply of electricity to about 900 houses in the Walker and Fenham areas at present served only by gas. The scheme had to be deferred on Government instructions some time ago, but it is understood that the North Eastern Electricity Board can supply about 140 houses immediately, provided that the wiring is carried out by the City Council.

Morpeth Town Council is to proceed immediately with the installation of electricity in 422 houses at present supplied only with gas. It is expected that the contracts will be let within a few weeks.

Easington (Co. Durham) R.D.C. proposes to install an extra lighting point in about 100 old people's houses and a staircase lighting point with two-way switches in about 400 other houses. The total cost of the work will be about £1,400.

St. Lawrence Seaway

The United States Senate, by 40 votes to 30, last week decided to send the St. Lawrence Seaway Bill back to the Foreign Relations Committee which had reported the Bill to the Senate without any recommendation. This decision was taken in spite of an appeal by President Truman who said that it would be one of the worst economic mistakes ever made by the country to let the St. Lawrence Seaway project fail by default. In Ottawa, the Minister of External Affairs said that the Senate vote meant that Canada should now go ahead immediately with its own plans for the seaway.

Route of 275 kV Line

Although the main route of the proposed 275 kV cable from Carlisle to Stella (near Newcastle-on-Tyne) has been approved by the Ministry of Fuel, it is stated that the authorities are prepared to consider representations for any minor adjustments of the route. Several local Councils and branches of the National Farmers' Union which have objected to the proposed route have made recommendations for adjustments.

Ulster Rural Electrification

By the end of this year it is expected that 6,056 farms in Northern Ireland will be supplied with power by the Electricity Board. At the end of 1948 the Board had connected 2,303 farms; 628 were added in 1949, 843 in 1950 and 1,482 in 1951, making 5,256. Thus

in the three years ended 31st December last the Board more than doubled the number of farms supplied. Just over a third of the total are using electricity for specific farm purposes, the remainder limiting their use to domestic applications. The Ministry of Commerce points out that the main object in rural electrification is to enable the farmer to reduce his costs and increase his production by using electricity for such tasks as water pumping, milking and the treatment of food for stock.

Welsh Rural Needs

Pleas for electricity in the rural areas were made at the annual meeting of the Montgomery County Association of Parish Councils held at Newtown on Tuesday last. The secretary, Mr. G. H. Rees, said that in England 64 per cent of the farms were connected; in North Wales the figure was 19 per cent, and in South Wales 13 per cent. At the present rate it would be 20 or 30 years before remote farms in Montgomeryshire were connected. The Association is to ask for a meeting with the Merseyside and North Wales Electricity Board to discuss the matter.

Arctic Power Station

On 15th June King Gustav Adolf of Sweden officially inaugurated the country's largest power station, at Harspranget in the far north. The station contains three 105,000 kVA generators installed in a chamber excavated in the rock 200ft below ground level. To connect the station with the industrial centres in the south the Swedish State Power Board has constructed a transmission system to operate at 380 kV.

Overhead Line Application

The Midlands Electricity Board is applying to the Minister of Fuel and Power for consent to the erection of an overhead line to Cliffe Cottage on the Warwick road at Stratford-on-Avon. Planning permission has been granted by the county planning officer, but the Corporation Town Planning and Plans Committee opposes the proposal.

Dearer Electricity in Victoria

Electricity charges in Victoria are being raised by 20 per cent. This is made necessary because an increase in basic wages will add at least £1 million to the State Electricity Commission's expenses, while costs of materials and services are rising steeply.

Liability for Cost of Mains

Cardiff Corporation reports that the South Wales Electricity Board has made connections to street lamps in the city for which the Board has presented accounts totalling £2,500. Further connections are estimated to cost £2,700 per annum for the next few years, but the Board is not prepared to carry out this work until the Council has agreed to accept liability. The Council is recommended to obtain the opinion of leading counsel in the matter.

Shortage of Gas Pipes

It is reported that owing to the steel position which has caused a shortage of cast-iron gas pipes, Sunderland Town Council may have to install electricity, instead of gas, in a greater number of new houses. Representations are being made on the matter but the Council has been informed that it is a national and not a local shortage.

Street Lighting Schemes

JARROW Town Council is recommended to approve in principle the replacement of gas lighting in main streets by electric lighting. It is proposed to provide 112 160 W sodium lamps and the capital cost will be £10,000 with annual maintenance £702. Maintenance costs for 90 gas lamps which will be replaced are £967 per annum.

DARLINGTON Town Council has obtained sanction to borrow £1,210 for street lighting on the Haughton South housing estate.

CARLISLE City Council has protested to the North Western Electricity Board against the delay in connecting the street lighting on Carlisle housing estate to the mains.

STAMFORD Town Council have approved a scheme for the conversion from gas to electricity of the lighting of the Great North Road through the town apart from a small portion of its length to the south, for which Ministry of Transport consent cannot be obtained.

French Railway Electrification

TUESDAY last marked the completion of the electrification of the French main line between Paris and Lyons, covering a distance of 318 miles. Since the first section between Laroché-Migennes and Dijon was inaugurated in March, 1950, services have been considerably accelerated. The journey from Paris to Dijon by the fastest train has been reduced from 3 hours 46 minutes with steam traction to 2 hours 32 minutes with electric traction, the latter time representing an average speed from start to stop of 77 m.p.h. They will be still further accelerated next winter when the time taken for the journey from Paris to Lyons will be reduced from 6 hours 7 minutes by the fastest steam train to 4 hours 15 minutes by electric train, representing an average speed of 75 m.p.h. including a stop at Dijon. Great economies have been effected in operating expenses. Only 225 electric locomotives are required to do the work formerly carried out by 600 steam locomotives.

FINANCIAL SECTION

Company Notes and Stock Exchange Activities

Reports and Dividends

General Electric Co., Ltd.—The Treasury has consented to the issue to ordinary stockholders of 5,877,720 ordinary shares by capitalizing £5,877,720 of the share premium reserve. The new shares will be allotted to the ordinary stockholders, credited as fully paid and on the basis of one new share for each £1 of ordinary stock.

Marco Refrigerators, Ltd., announce that no interim ordinary dividend will be paid in respect of the year to 30th September next. The chairman states that no interpretation should be placed upon this decision relative to the possibilities of a final payment. For the previous year the interim dividend was 7½ per cent, no final being paid.

Pye (Ireland), Ltd., reports a trading profit for the year ended 31st March last of £74,591, as compared with £62,921 for the preceding year, and a net profit of £62,090 (against £52,785), before tax of £31,200. The dividends and bonus for the year total 14 per cent (against 12½ per cent), and £34,458 is carried forward (against £20,173 brought in).

Ultra Electric (Holdings), Ltd., reports a group net profit for the year to 31st March, after taxation of £32,000, of £130,385, as compared with £101,591 for the preceding year. It is proposed to pay a dividend for the year of 10 per cent and to carry forward a credit balance of £29,278 (against a debit balance of £46,701 brought in). The previous dividend was 5 per cent for 1947-48.

The Mirrlees Watson Co., Ltd., reports a net profit for the year ended 31st March last of £138,240, as compared with £109,955 for 1950-51. General reserve receives £70,000 and it is proposed to pay an ordinary dividend for the year of 15 per cent (against 12½ per cent). The balance carried forward is £26,815 (against £25,043 brought in).

The Aberdare Electric Co., Ltd., reports a profit for the year to 31st March last, after deducting all expenses, including depreciation, of £40,161, as compared with £24,371 for the previous year. The ordinary dividend for the year is 8 per cent (against 6 per cent), and £17,913 is carried forward (against £8,714 brought in).

East African Power & Lighting Co., Ltd.—The Power Securities Corporation, Ltd., announces that underwriting has been completed in respect of an issue of 1,737,777 ordinary shares of 20s each of the East African Power & Lighting Co. at 22s 6d per share. The issue will be made by way of letters of rights to preference and ordinary shareholders on the registers on 10th June in the proportion of one new share for every three shares held.

Keith Blackman, Ltd., reports a profit for the year to 31st March last of £322,272, as compared with £238,170 for 1950-51, before taxation of £200,000. General reserve receives £75,000 and pensions reserve £15,000. The dividend for the year is 25 per cent (against 22½ per cent), and £77,464 is carried forward (against £90,342 brought in).

Matthew Hall & Co., Ltd.—In his statement circulated with the annual report Mr. Bertram Baden, chairman, said that the Royal Festival Hall experimental heat pump installed for the Ministry of Fuel and Power was used to provide chilled water to the air conditioning plant during last summer and to provide heat during the winter. One of their contracts was for the installation of steam turbo-generating plant in Nigeria. It was unfortunate that they had had to leave Abadan where they had almost completed the installation of turbo-generators.

Greenwood & Batley, Ltd., report a profit for the year ended 31st March last of £50,044, as compared with £50,817 for the preceding year, after deducting taxation of £84,049. General reserve receives £25,000, stores depreciation reserve £12,000, and writing down investments £10,000. It is proposed to pay a final ordinary dividend of 10 per cent, making 15 per cent for the year (unchanged).

Telegraph Construction & Maintenance Co., Ltd.—An extraordinary general meeting has been called for 8th July to consider resolutions (a) increasing the capital from £1,500,000 to £3,000,000 by the creation of 1,500,000 additional £1 shares ranking *pari passu* with the existing shares and (b) capitalizing £325,682 of the reserves and issuing to shareholders as fully paid up shares in the proportion of one new share to each three at present held.

Telephone Manufacturing Co., Ltd., record gross profits of the group for 1951 totalling £286,474, compared with £299,273 in 1950. The net profit of the parent company

was £80,321 (£86,413). A sum of £75,000 (£25,000) is transferred to general reserve and £1,700 (nil) provided against diminution in value of quoted investments. Dividends take £26,250 (£26,563) and the group carry-forward is raised from £172,539 to £192,352.

The Electric Construction Co., Ltd., reports that, after providing for taxation amounting to £135,710 (£124,708), the net profit for the year ended 31st March was £89,373 (£97,369). General reserve receives £20,000 (same), plant replacement reserve £30,000 (£20,000) and the superannuation fund nil (£20,000). The ordinary dividend is maintained at 15 per cent and £60,805 (£52,252) is carried forward.

W. T. Henley's Telegraph Works Co., Ltd.—Of 3,250,000 new ordinary shares offered to ordinary stockholders at 14s 6d a share, about 2,875,000 shares were taken up, the balance being absorbed by applications for "excess" shares.

Broadcast Relay Service, Ltd., reports a consolidated net profit of £541,837 for the year ended 31st March, compared with £528,903 in the previous year. A final dividend of 8 per cent maintains the ordinary dividend at 16 per cent, free of tax.

Anglo-Portuguese Telephone Co., Ltd.—The recent "rights" issue of 950,000 ordinary £1 shares at 20s 6d a share was undersubscribed, the underwriters being called upon to take up 55.8 per cent.

Allen West & Co., Ltd.—The issue to stockholders of 780,000 ordinary 5s shares at 8s a share was oversubscribed.

J. & E. Hall, Ltd., propose to maintain their interim dividend at 2½ per cent.

New Companies

J. B. Andrews (Electro-Mech), Ltd.—Registered 14th June. Capital £3,000. Manufacturers of and dealers in all kinds of electrical equipment, including transformers, radio gramophones and radio equipment, etc. Directors: J. B. Andrews, Gladys B. Andrews and L. H. H. Cooper. Regd. office: Felden Works, Hartfield Crescent, Wimbledon, S.W.19.

Ultrasonics, Ltd.—Registered 7th June. Capital £3,000. To obtain from E. C. Cottell and J. E. Goodman the whole rights in the United Kingdom, in the invention entitled "Apparatus for the mechanical production of ultrasonic vibrations for use in emulsification, separation or like processes," and to carry on the business of consulting, superintending, civil, constructional, chemical, motor and electrical engineers, etc. Directors: N. Duckels, E. S. Lower, E. C. Cottell and J. E. Goodman. Regd. office: Croda House, Snaith, nr. Goole, Yorks.

Baldwin Electrical Co. (St. Marylebone), Ltd.—Registered 17th June. Capital £600. Electrical engineers and contractors, etc. Directors: C. E. Baldwin, S. R. Baldwin and Mrs. E. M. Baldwin (secretary). Regd. office: 45, Dorset Street, Baker Street, W.1.

Bankruptcies

M. C. Usher, 31, Ranelagh Garden Mansions, Hurlingham, London, S.W.6, electrical contractor and decorator.—First meeting 2nd July and public examination 22nd July, both at Bankruptcy Buildings, Carey Street, London, W.C.2.

T. Maund, 37, Earle Road, Bramhall, Ches, lately carrying on business at 80, Wellington Road North, Heaton Norris, Stockport, Lancs, as an electrical engineer under the style of "Beacon Electrical Co."—Last day for receiving proofs for dividend 1st July. Trustee, Mr. F. C. Ormrod, 20, Byrom Street, Manchester, Official Receiver.

H. Cooke, wireless and electrical engineer, carrying on business as "Western Wireless" at 33, Fisherton Street, Salisbury.—Supplemental dividend of 1s 10d in the £ (making 20s in the £) and statutory interest at 4 per cent per annum, payable 3rd July at the Official Receiver's office, 54, Endless Street, Salisbury.

Meeting of Creditors

Cumbrian Electrical Co., Ltd.—A meeting of creditors is to be held at Midland Bank Chambers, Penrith, on 4th July.

Liquidations

United Electronics, Ltd.—A general meeting of members is to be held on 28th July at the offices of Percy Phillips & Co., 76, New Cavendish Street, London, W.1, to receive an account of the winding-up by the liquidator, Mr. P. Phillips.

Electrical Engineering & Advice Bureau, Ltd., electrical contractors, 27, Regent Street, London, W.1.—Proofs for dividend by 5th July to Mr. H. P. Naunton, Senior Official Receiver and liquidator, 346, Strand, London, W.C.2.

Isle of Thanet Electric Supply Co. Ltd. (In voluntary liquidation).—Meeting of members 18th July at Winchester House, Old Broad Street, London, E.C., to receive an account of the winding-up by the liquidator, Mr. C. Collins.

STOCKS and SHARES

ANOTHER severe setback in the gilt-edged market, under the lead of War Loan, unsettled again the foundation on which most forms of investment at present rest. Matters put forward by way of explanation included a weakening in the foreign exchange rates for the pound sterling, and selling of securities by industrial companies pinched for working capital as a result of the credit restriction policy. A tendency for tension to increase with the approach of each successive Thursday, which is the day on which Bank Rate decisions are taken, indicates continued uncertainty on the question of whether the Treasury's policy on interest rates has yet run its course. With War Loan falling a full point, most of the "dated" stocks, including the British Electricity issues, lost about the same on the week.

Present Yields

Measured by the popular market indices, and calculated from the last-paid dividends, the average yield obtainable now from investments in leading industrial ordinary shares is nearly 6½ per cent, which compares with an average of not much over 4½ per cent a year ago. The present figure represents a return some 30s per cent above that offered by 3½ per cent War Loan. Shares offering the buyer anything less than 6 per cent on his money form a select and narrowing circle, in which electrical equipment shares claim a rather disproportionately large number of places. Among them may be counted the shares of the big groups such as A.E.I. and English Electric, and, also, such notably conservative dividend-payers as Chloride Electric, Lucas, Reyrolle, Automatic Telephone, Crabtree and Telegraph Condenser. As can be seen from the accompanying share lists, it is possible now to invest on a 6 to 7 per cent yield basis in the shares of a wide range of well-known electrical engineering firms.

Stock on Offer

Among electrical equipment ordinary shares, the new issues of Henley's and Allen West remain in free supply. Both are still available free of transfer stamp. At prices of 8s (7s 6d paid) and 9s 3d (fully paid) they give prospective yields respectively of approximately 6⅜ and 8⅛ per cent. Lancashire Dynamo £1 shares have lately been on offer at about £2, to yield 6¼ per cent. Switchgear & Cowans 5s shares at 14s 3d return 7·9 per cent; Morphy-Richards 4s shares at 15s and Southern Areas £1 shares at 9s 6d show more than 10 per cent on the last dividends. In the preference lists is a line of Murphy Radio 5½ per cents at 20s 3d, giving 5·4 per cent on the money; and another of Hoover 5½ per cent preference at 21s 6d, yielding £5 2s 4d.

Siemens Issue

The capital issue by Siemens Brothers, of which advance notice was given a month ago, takes the form of an offer to existing shareholders of new ordinary shares at 28s, in the proportion of one new for every two shares held. It will raise about £1,700,000. Market reactions to these occasions have become depressingly monotonous. Whether or not the selling of "rights" develops any weight, the disposition now is for shares concerned to be marked down almost automatically in anticipation of it. Siemens shares have been in a decline from the time the operation was not unexpectedly mooted. They took a sharper drop on the actual news, so that the bonus element in the offer narrowed to less than a shilling. Similar news affected East African Power 20s shares, which fell 2s to 24s on the announcement of an offer of shares at 22s 6d. Close on £2 million is involved in this issue.

Telegraph Condenser Bonus

The Telegraph Condenser Company's 10s ordinary shares have been quoted, since the middle of this month, ex the 25 per cent capital bonus. Strictly speaking, shares have on these occasions to be assessed on the assumption of a reduction in the next rate of dividend in proportion to the larger number of shares ranking for participation. Telegraph Condenser's last total of 20 per cent would be equivalent to 16 per cent on the present capital. It was, however, very substantially within the group's earning capacity, involving the distribution of only £21,000 net, from an available surplus of nearly £190,000. In support of market hopes that the full 20 per cent will be maintained, is the precedent of last year, when a one-for-three share bonus was distributed without affecting the rate paid. With the shares at 36s 3d, the yield works out at 5½ per cent on a 20 per cent payment.

Plessey Dividends

The Plessey Company's recent decision to raise the interim ordinary dividend for the current year (which ends this month) from 10 to 12½ per cent bears out the good account of progress given in the annual report six months ago, when the new Northamptonshire factory was said to be on the eve of production. Plessey had a remarkably successful year in 1950-51, trebling the net profit and earning the equivalent of 144 per cent on the ordinary capital, which received a modest increase in the dividend from 20 to 22½ per cent. The 5s ordinary shares have behaved relatively steadily in recent months. At 17s they pay a little over 6½ per cent on the money, without taking into account the increase in the interim dividend.

Electrical Investments

Past Week's Price Changes

Company	Dividend Previous	Dividend Last	Middle Price June 23 1952	Week's Rise or Fall	Est. Yield £	Est. Yield s	Est. Yield d
Gilt-edged and Overseas Stocks							
Brit. Elec. 1968/73	3	3	80	—1	3	15	0
Brit. Elec. 1974/77	3	3	79	—1	3	16	0
Brit. Elec. 1976/79	3½	3½	85	—1	4	2	6
Brit. Elec. 1974/79	—	4½	98	—1	4	6	9
Calcutta Elec. ..	6†	6†	19/3	—	6	4	8†
East African Power	7	7	24/-	—2/-	5	14	9
Nigerian Elec. ..	10	10	20/	—9d	10	0	0
Palestine Elec. "A"	5†	5†	13/6	—	7	8	2†
Perak Hydro-Elec.	Nil	Nil	11/6	—		Nil	
Equipment and Manufacturing							
Aberdare Cables (5/-)	20	20	10/9	—	9	6	0
Aerialite (1/-) ..	83⅓	88⅓	7/3	—6d	12	4	0
Aron Elec. Ord. ..	15	15	32/6	—	9	4	8
Assoc. Elec. Ord. ..	20	20	69/6	—	5	15	2
Automatic Tel. & El.	15	15	53/9	—⅛	5	11	6
Babcock & Wilcox	18	18	60/9	—	5	18	6
Baldwin, H. J. (2/-)	25	25	4/9	—	10	10	6
Bakelite (10/-) ..	—	—	18/3	—		—	
British Aluminium	10	12	37/3	—6d	6	8	8
B.I. Callender's ..	7½	9	29/3	—	6	3	0
British Thermostat (5/-)	30	30	24/6	—	6	2	5
British Vac. Cleaner (5/-)	25	25	12/6	—	10	0	0
Brook Motors (10/-)	20	20	28/9	—3/3	6	19	2
Brush Ord. (5/-) ..	10	10	4/6	—	11	2	2
A. F. Bulgin (1/-)..	27½	30	2/9	—	10	18	2
Burco (5/-) ..	42½	38¾	18/9	—	10	6	8
Chloride El. Storage	15	15	53/9	—½	5	11	6
Cole, E. K. (5/-) ..	20	25	14/3	+3d		—	
Cossor, A. C. (5/-)	Nil	Nil	10/-	—6d		Nil	
Crabtree (10/-) ..	17½	17½	31/-	—	5	13	0
Crompton Parkinson Ord. (5/-) ..	11¼	11¼	8/6	—	6	12	3
De La Rue (5/-) ..	50	50	10/-	—9d	12	10	0*
Decca (1/-) ..	112½	112½	13/6	—1/6	8	6	0
Dewhurst (2/-) ..	35	22½*	4/6	—		—	
Dictograph Tel. (2/-)	20	20	4/9	—	8	8	6
E.M.I. (10/-) ..	8	12	13/6	—3d	8	19	2
Electrical Components (5/-) ..	20	20	10/-	—	10	0	0
Elec. Construction	15	15	45/-	—½	6	13	4
Enfield Cable Ord.	7½	7½	17/-	—2/-	8	16	6
English Electric ..	15	15	51/6	—	5	16	6
Ericsson Tel. (5/-)	22†	22†°	34/3	—	3	4	3†
Ever Ready (5/-)..	35	35	22/-	—	7	19	0
Falk Stadelmann	15	15	35/9	—	8	7	10
G.E.C. Ord. ..	17½	22½	74/6	—1/6	6	0	10
General Cables (5/-)	30	30	12/6	—	12	0	0
Greenwood & Batley	15	15	40/-	—	7	10	0
Hackbridge Cable (5/-)	20	20	9/9	—	10	5	2
Hackbridge Hewittic (5/-)	15	18	14/-	—	6	8	7
Hall Tel. Acc. (10/-)	10	10	10/-	—	10	0	0
Heatrae (2/-) ..	12½	12½	4/-	—	6	5	0
Henleys (5/-) ..	20	20	14/9	—6d	6	15	6
Holophane (5/-) ..	15	15	8/3	—		—	
Hoover (5/-) ..	37½	35*	22/6	—6d	7	15	6

Company	Dividend Previous	Dividend Last	Middle Price June 23 1952	Week's Rise or Fall	Est. Yield £	Est. Yield s	Est. Yield d
Equipment and Manufacturing (continued)							
Intl. Combustion (5/-)	20	25	20/6	—	6	2	0
Johnson & Phillips	15	15	48/3	+9d	6	4	2
Lancashire Dynamo	22½	12½°	38/6	—1/6	6	9	1
Laurence, Scott (5/-)	12½	15	12/3	—	6	2	6
London Elec. Wire	10	12½	42/-	—6d	5	19	0
J. Lucas	17½	7½°	29/6	—	5	1	9
Marryat & S. (2/-)	—	22½	5/-	—	9	0	0
Mather & Platt ..	12½	12½	36/3	—2/-	6	17	9
Metal Industries..	10	10	36/-	—	5	11	1
Mid. Elec. Mfg. ..	15	15	55/-	—	5	9	0
Murex	10	12½	45/-	—	5	11	1
Newman Ind. (2/-)	6	10	2/6	—3d	8	0	0
Oldham & Son (1/-)	30	30	4/3	—	7	1	3
Parnall (Yate) (5/-)	6	6	3/-	—	10	0	0
Parsons, C. A. ..	15	10°	47/6	—	4	4	3
Plessey (5/-) ..	20	22½	17/-	—	6	12	4
Pye Deferred (5/-)	35	18°	15/6	—	5	16	3
Revo (10/-) ..	27½	27½	33/9	—	8	3	0
Reyrolle	15	10°	40/-	—1/-	5	0	0
Scot. Cable (4/-) ..	30	30	18/9	—3d	6	7	8
Siemens Ord. ..	10	10	28/9	—½	6	19	3
Strand Elec. (5/-)..	17½	17½	8/3	—	10	12	2
Sturtevant (5/-) ..	16½†	17¼°†	22/-	—		—	
Switchgear & Cowans (5/-)	22½	22½	13/9	—⅛	8	3	8
Taylor T. (5/-) ..	20	20	20/-	—	5	0	0
T.C.C. (10/-) ..	20	20°	36/3	—		—	
T.C. & M. ..	10	10	30/-	—⅛	6	13	4
Telephone Mfg. (5/-)	10	10	7/9	—	6	9	0
Thorn Elec. (5/-) ..	20	10°	7/9	—	6	9	0
Tube Investments	25	25	50/-	+6d		—	
Vactric (5/-) ..	Nil	Nil	4/6	+3d		Nil	
Veritys (5/-) ..	Nil	7½	3/9	—	10	0	0
Walsall Conduits (4/-)	70	70	46/3	—	6	1	0
Ward & Goldstone (5/-)	44	45°	36/3	—	6	0	0
Watford (2/-) ..	25	25	6/-	—	8	6	8
Westinghouse Brake	14	14	44/-	—1/-	6	7	3
West, Allen (5/-) ..	12½	15	9/3	+6d	8	2	2
Trusts, Transport and Communications							
Anglo-Am. Tel.: A Ord.	—	4½	77½	—	5	16	3
Ord.	—	56⅓	55	—	5	2	3
Anglo-Portuguese	8	8	20/3	—3d	7	18	0
Brit. Elec. Traction: Def. Ord. ..	22½	25	340xd	—16	7	7	0
Cable & Wireless: Ord.	6	8	110½	—1	7	1	10
4% Loan ..	4	4	96	—	4	3	4
Calcutta Trams ..	6†	6†	21/-	—	5	14	3†
Cape Elec. Trams	4	5	12/6	—	8	0	0
Marconi Marine ..	7½	10	27/6	—	7	5	6
Oriental Tel. Ord.	16	16	52/6	+¼		—	
Telephone Props.	7	8	28/9	—	5	11	4
Tele. Rentals (5/-)	10	10	8/3	—	6	1	3

* After capital bonus.
† Dividends are paid free of Income Tax.

NEW PATENTS

Electrical Specifications Recently Published

The numbers under which the specifications will be printed and abridged are given in parentheses. Copies of each specification (2s 8d each including postage) will be obtainable after 6th August from the Patent Office, 25, Southampton Buildings, London, W.C.2.

1945

441. Metropolitan-Vickers Electrical Co., Ltd., Robinson, F. ... and Kay, J.—Vacuum electric discharge tubes and ... s therefor. 22nd March, 1946. (676861.)

444. Metropolitan-Vickers Electrical Co., Ltd., Robinson, F. ... and Kay, J.—Shells or casings on vacuum electric ... scharge tubes. 22nd March, 1946. (676862.)

1948

2912. British Thomson-Houston Co., Ltd.—Apparatus for sec...g-in discharge lamp cathodes. 22nd January, 1948. (676961.)

27913. British Thomson-Houston Co., Ltd.—Thermopile construction. 27th October, 1948. (676963.)

1949

551. General Electric Co., Ltd., and Harkus, G. N.—Electric solenoid arrangements. 6th January, 1950. (676866.)

6739. Naamlooze Vennootschap Philips' Gloeilampenfabrieken.—Circuits for cathode-ray tubes. 11th March, 1949. (676968.)

6953. Hollins, J. R.—Electric switch and lighting system for controlling vehicle signal lights. 14th March, 1949. (676970.)

7065. Evans O. (Schlatter, Ltd., H. A.).—Synchronous control device for electric welding machines. 15th March, 1949. (676971.)

9086. Sykes, B., and Robinson, C. C.—Antenna systems. 17th May, 1950. (676778.)

16713. Noyes, R. C. (Telefonaktiebolaget L. M. Ericsson).—Number transmission system for automatic telephone exchanges. 23rd June, 1949. (676880.)

16874. Reliance Electrical Wire Co., Ltd.—Rubber and similarly insulated electric cables and cable connectors. 22nd September, 1950. (676980.)

16896. Neale & Sons, Ltd., J., and Neale, M. R.—Electric inspection lamps. 26th June, 1950. (677001.)

17402. Electric & Musical Industries, Ltd.—Biasing arrangements for electron discharge tubes. 28th June, 1950. (676783.)

18413. Ferranti, Ltd., and Searby, N. H.—Thermionic valve amplifiers. 12th July, 1950. (676786.)

20049. Revo Electric Co., Ltd., Felton, A. E., and Hartill, P.—Directional refractors for street lighting and other purposes. 31st July, 1950. (676884.)

21336. British Thomson-Houston Co., Ltd.—Amplifier circuits. 16th August, 1949. (676787.)

21486. "Diamond H" Switches, Ltd.—Rotary cam actuated electrical switches. 16th August, 1950. (676788.)

23615. Dehn, S. G. (Automatic Electric Laboratories, Inc.).—Carrier current signalling system. 13th September, 1949. (676792.)

23802. Fielden (Electronics), Ltd., and Fielden, J. E.—Electrical recording devices. 8th September, 1950. (677017.)

24387. General Electric Co., Ltd., Cooper, B. S., and Hawkins, F. S.—Arc lamp equipments. 22nd September, 1950. (677018.)

28111. Bayer, O., and Cauer, E.—Foils for electrical equipment, in particular capacitors. 2nd November, 1949. (676893.)

28986. Ferranti, Ltd., Stewart, J., and Allen C.—Connector devices embodying separable connector elements. 13th November, 1950. (676799.)

29144. Philips Electrical, Ltd.—High-pressure mercury vapour discharge tubes. 17th November, 1949. (676988.)

29491. Bishop Gutta-Percha Co.—Self-sealing insulating material of high dielectric strength. 17th November, 1949. (676987.)

30592. Philips Electrical, Ltd.—Circuits for receiving and demodulating frequency-modulated oscillations. 29th November, 1949. (676899.)

33357. Westinghouse Electric International Co.—Electrostatic precipitators. 30th December, 1949. (676807.)

1950

333. Stone & Co. (Holdings), Ltd., J., Nixon, L. R., and Vickery, E. C.—Dashpot devices, particularly for electric regulators. 5th January, 1951. (676996.)

394. Soc. d'Etudes des Problemes de Courants Faibles S.E.P.C.O.—Loudspeaker communication system. 6th January, 1950. (676808.)

761. Westinghouse Brake & Signal Co., Ltd., and Jenkins, A.—Dry surface contact rectifiers. 6th December 1950. (676809.)

762. Westinghouse Brake & Signal Co., Ltd., Peter, L. H., and Jenkins, A.—Manufacture of dry surface contact rectifiers. 6th December, 1950. (676810.)

1695. English Electric Co., Ltd.—Beam compasses. 12th January, 1951. (677094.)

1846. Aktiebolaget Hagglund & Soner.—Electric train driven by a single-phase alternating current. 24th January, 1950. (676999.)

2083. Cinema-Television, Ltd., and Freeman, G. S. P.—Television pick-up tubes. 25th January, 1951. (676817.)

3462. English Electric Co., Ltd.—Control gear for steam turbines. 19th January, 1951. (677097.)

4096. Rotax, Ltd.—Electricity distributing systems and protective arrangements therefor. 4th January, 1951. (677024.) 4097. Protective apparatus for electricity distributing systems. (677025.)

4936. Cinema-Television, Ltd.—Shutters, particularly for use in television systems. 27th February, 1951. (676907.)

5456. General Electric Co., Ltd., Allard, L. S., and Hill, R. T.—Cathode-ray tubes. 27th February, 1951. (676908.)

5521. Fisher, H.—Electric heaters for chicken brooders and the like. 27th February, 1951. (676909.)

5556. Westinghouse Brake & Signal Co., Ltd., and Stevens, S. A.—Prevention of sparking at the contacts breaking a d.c. inductive electric circuit in mines and like places. 30th January, 1951. (676824.)

6764. Valchera, V.—Electromagnetic vibratory rectifiers. 27th February, 1951. (676827.)

7170. British Thomson-Houston Co., Ltd.—Audio frequency amplifiers. 22nd March, 1950. (676828.)

7320. National Research Development Corporation.—Thermionic valve circuits. 26th February, 1951. (676911.)

8671. Tudor Accumulator Co., Ltd.—Electric battery control systems. 26th February, 1951. (676830.)

10795. Westinghouse Brake & Signal Co., Ltd., and Watson, T. F. E.—Electric control devices of the transductor type. 21st February, 1951. (676835.)

11163. Standard Telephones & Cables, Ltd.—Electric impulse signalling system. 5th May, 1950. (676836.)

11638. Philips Electrical Industries, Ltd.—Magnetrons. 10th May, 1950. (676914.)

13476. Schranz, R.—Electrical plug-and-socket connectors for cystoscopes and other endoscopic instruments. 5th January, 1951. (676918.)

16268. Philips Electrical Industries, Ltd.—Gas and/or vapour filled electric discharge tubes. 29th June, 1950. (677035.)

16391. Western Electric Co., Inc.—Microwave apparatus. 30th June, 1950. (676840.)

17470. British Thomson-Houston Co., Ltd.—Electric radiant fan heaters. 12th July, 1950. (677037.)

18293. Standard Telephones & Cables, Ltd.—Stabilized ultra-high-frequency oscillator system. 21st July, 1950. (676842.)

19880. Arlux.—Luminescent tubular electric lamp feed sockets. 10th August, 1950. (676844.)

19919. Philips Electrical Industries, Ltd.—Electric circuits having electric loading coils for use in telephony. 10th August, 1950. (677039.)

20435. British Thomson-Houston Co., Ltd.—Suction cleaners. 17th August, 1950. (676846.)

20502. Standard Telephones & Cables, Ltd.—Facsimile transmitters. 18th August, 1950. (677040.)

20852/3. Brush Development Co.—Piezo-electric device. 23rd August, 1950. (676847/8.)

21653. Hoover, Ltd.—Bearing assemblies of electric motors. 1st September, 1950. (677041.)

23309. Lumalampan Aktiebolag.—Cut-outs in electrical incandescent lamps. 22nd September, 1950. (676932.)

23568. British Thomson-Houston Co., Ltd.—Electric discharge lamps. 26th September, 1950. (677044.)

26192. Rheinische Rohrenwerke Akt.-Ges.—Electric arc welding. 26th October, 1950. (676935.)

26530. Research Corporation.—Rotary electrostatic precipitator. 31st October, 1950. (676855.)

27182. Parsons, J. B.—Three-position electric switch. 7th November, 1950. (676937.)

30756. Philips Electrical Industries, Ltd. Transformers or inductance coils. 18th December 1950. (677051.)

30873. Akt.-Ges. Brown, Boveri & Cie.—Cooled turbine rotor. 19th December, 1950. (677052.)

31648. Sangamo Weston, Ltd.—Ohmmeters. 29th December, 1950. (677054.)

1951

1209. Compagnie Générale de Télégraphie sans Fil.—Ultra short electrical wave-guides particularly applicable to transmission across rotating joint. 16th January, 1951. (676939.)

4645. Standard Telephones & Cables, Ltd.—Microwave transmission system. 26th February, 1951. (676947.)

4758. British Thomson-Houston Co., Ltd.—Electrostatic generators. 27th February, 1951. (676953.)

HOLLAND'S ELECTRICAL TRADE

ELECTRICAL imports into Holland last year increased appreciably in a number of lines, notably transformers and the larger motors, wires and cables, radio apparatus (from Belgium) and radio valves from that source too, as well as from West Germany, telephone apparatus and vacuum cleaners. The share of the United Kingdom was not large, while that of West Germany progressed in many directions. Some leading import items are shown in the accompanying table with notes of increase or decrease compared with 1950. In addition, the Netherlands bought increased quantities of apparatus for regulating and distributing current, instruments, and unspecified power plant from abroad.

Holland does a progressive export trade in motors and certain installation material but it is sma'l in relation to imports. Her exports of lamps expanded considerably between 1950 and 1951 and those of radio goods by about 50 per cent. In these two important Dutch export activities details of countries of destination are not available. For loudspeakers, microphones, etc., and telephone material, markets included Indonesia and a number of South American countries as well as many parts of Europe. (The guilder = about 2s.)

Imports and Principal Supplying Countries	1951 Gld. (000)	Inc. or dec. on 1950 Gld. (000)
Motors, 10 kg or less	1,404	— 247
From United Kingdom	743	— 30
„ *West Germany*	257	— 39
Motors, over 10 kg	18,599	+ 3,173
From United Kingdom	3,425	— 1,263
„ *Belgium-Luxemburg*	3,525	— 130
„ *West Germany*	7,170	+ 4,053
Transformers, 10 kg or less	2,292	+ 619
From Belgium-Luxemburg	1,720	+ 510
„ *United Kingdom*	184	+ 43
„ *United States*	15	— 125
„ *West Germany*	198	+ 94
Static convertors, over 10 kg	2,189	— 683
From United Kingdom	1,384	+ 174
„ *Belgium-Luxemburg*	120	— 304
„ *West Germany*	339	— 56
Accumulators	2,733	— 2,253
From Belgium-Luxemburg	945	— 405
„ *West Germany*	464	— 680
Vacuum cleaners	4,209	+ 1,650
From United Kingdom	1,935	+ 650
„ *Sweden*	973	+ 277
„ *West Germany*	1,031	+ 645

Imports and Principal Supplying Countries	1951 Gld. (000)	Inc. or dec. on 1950 Gld. (000)
Electro-medical apparatus, other than tubes	3,230	— 255
From United Kingdom	620	— 89
„ *West Germany*	1,351	+ 665
„ *Switzerland*	84	— 708
„ *Italy*	507	+ 357
Radio valves	13,072	+ 7,141
From Belgium-Luxemburg	3,499	+ 1,282
„ *United Kingdom*	2,157	+ 912
„ *West Germany*	2,978	+ 2,401
Radio apparatus	47,596	+ 19,359
From Belgium-Luxemburg	38,604	+ 15,571
Telephone apparatus	22,648	+ 5,902
From Belgium-Luxemburg	11,218	+ 3,184
„ *Sweden*	2,907	+ 487
„ *United Kingdom*	1,711	— 311
„ *Switzerland*	4,246	+ 2,060
Insulated wires and cables	21,255	+ 6,998
From Belgium-Luxemburg	6,745	+ 3,736
„ *West Germany*	8,491	+ 1,931
„ *United Kingdom*	4,139	+ 2,101

CONTRACT INFORMATION

Accepted Tenders and Prospective Electrical Work

CONTRACTS OPEN

Where "Contracts Open" are advertised in our "Official Notices" section the date of the issue is given in parentheses.

Australia.—SYDNEY.—28th August. County Council. Oil immersed current limiting reactors. (C.R.E. 21307/52. Ten/4179.)*

MELBOURNE.—3rd July. Director of Posts and Telegraphs. Power oscillators and signal generators. (C.R.E. 21680/52. Ten/4196.)*

BRISBANE.—3rd September. Queensland State Electricity Commission. Supply and erection of l.v. switchgear at the Howard power station (C.R.E. 21990/52. Ten/4206.)*

The closing dates for tenders for suburban and inter-urban electric rolling stock (Notices Ten/2787, 2983 and 3637) have been extended to 27th August. The New South Wales Commissioner of Railways proposes to arrange for two comprehensive contracts. (C.R.E. 6712/52.)*

Formosa (Taiwan).—11th July. Central Trust of China. Supply of rubber covered wire and copper wire. (C.R.E. 21034/52. Ten/4189.)* Rubber covered wire. (C.R.E. 21453/52. Ten/4188.)*

Iraq.—BAGDAD.—15th July. Directorate of Civil Medical Stores. Supply of eleven electrical air conditioning sealed units. (C.R.E. 21620/52. Ten/4198.)*

Nuneaton.—7th July. Borough Council. Electrical installations in all departments of Stockingford County School. Borough surveyor, Council House.

Portuguese West Africa.—NOVA LISBOA.—1st September. Municipality. Armoured cables and materials and gear for nine transformer stations. The contract for the transformers has already been placed. (C.R.E. 20709/52. Ten/4190.)*

Prescot.—12th July. U.D.C. Sodium lighting installation on the Liverpool-Warrington trunk road. (See this issue.)

Selkirk.—14th July. Town Council. Street lighting. (See this issue.)

South Africa.—PRETORIA.—31st July. Union Tender and Supplies Board. Magneto switchboards. (C.R.E. 21028/52. Ten/4177.)*

Tetuan.—21st July. Civil Hospital. Radiotherapy apparatus. (C.R.E. 20997/52. Ten/4174.)*

Uruguay. — MONTEVIDEO. — 19th August. Usinas Electricas y Telefonos del Estado. Substation transformers for 30/6 kV network of the town of Paysandu. (C.R.E. 21588/52. Ten/4187.)* 22nd July. Supply of 185,000 porcelain insulators. (C.R.E. 21672/52. Ten/4197.)*

*Specifications may be inspected at the Commercial Relations and Exports Department, Board of Trade, Horse Guards Avenue, Whitehall, S.W.1 (Trafalgar 8855).

ORDERS PLACED

Glasgow.—Municipal Transport Committee. Negative boosters for the Whitevale substation (£8,970).—G.E.C.

London.—L.C.C. Provision and installation of lift at Strand Comprehensive High School and at King's Park Comprehensive High School, Eltham.—Hammond & Champness, Ltd.

Norwich.—City Council. Recommended. Electrical work at the Central Library (£1,010).—Secker & Sons (Norwich), Ltd.

CONTRACTS IN PROSPECT

Particulars of new works and building schemes for the use of electrical installation contractors and traders. Publication in this section is no guarantee that electrical work is definitely included. Alleged inaccuracies should be reported to the Editors.

Barrow-in-Furness.—Houses (135), Ormsgill estate; borough surveyor.

Billinge and Winstanley (Lancs).—Houses (28) for U.D.C.; J. Gaskell & Sons, Ltd., Upholland Road, Winstanley.

Blackpool.—Extensions at St. Joseph's College, Newton Drive; Halstead Best, architect, 20, Clifton Street.

Blaydon (Co. Durham).—X-ray department at Normans Riding Hospital for Newcastle Hospital Board, Osborne Road, Newcastle-on-Tyne; chief architect.

Bootle.—Houses (356), Sterrix Lane and Cabbage Inn; borough engineer.

Bournemouth. — Factories and additions; Hercules Mills, Ltd., Green Road, Winton.

Bristol.—Houses (126), Redcliffe Hill, 46 at Hotwell Road, and dwellings at Great Ann Street; J. B. Bennett, city engineer, Bath Road, Brislington, 4.

Burton-on-Trent. — Proposed Winshill Junior School; borough surveyor, Town Hall.

Flats (32), Balfour Street; borough engineer.

Cannock.—Bungalows (34), Heath Street and High Mount Street, Hednesford; A. Edwards & Co., Hednesford.

Chester-le-Street. — Houses (163) for R.D.C.; F. Bowman, architect, Estate Office, Birtley, Co. Durham.

Chippenham.—Houses (20), London Road; borough surveyor, 10, Market Place.

Colchester. — Dwellings (110), Monkwick estate; borough surveyor.

Dewsbury.—Crematorium; borough architect, Town Hall.

Dumfriesshire. — Schools at Troqueer (£85,000) and Locharbriggs (£50,000); county architect, Dumfries.

Dunstable.—Houses (26), Brewers Hill estate (£32,666); H. & H. E. Sanders, builders, Luton Road, Markyate.

Durham.—Pithead baths at Thrislington Colliery; N.C.B. Architects' Department, Ashfield Tower, Gosforth.

Easingwold.—Houses (46) and six bungalows; R.D.C. surveyor, Croft House, Easingwold, Yorks.

Eastbourne.—Flats (27), Ceylon Place and Langney Village; borough engineer.

Paper mill; Broadvale Industries, Ltd., 16, Gildredge Road.

Rebuilding St. John's Church (£100,000); J. Longley & Co., builders, Crawley.

Felixstowe.—Houses (74), south side of Mill Lane; R. W. Harvey, clerk to U.D.C., Town Hall.

Gateshead.—Junior school, Southend Road; William Hall & Sons, Derwentwater Road.

Glasgow.—Flats for single persons (56), Cranhill, and shops and maisonnettes on sites at Lamlash Crescent and Milton; director of housing, 20, Trongate.

Grays.—Divisional headquarters and fire station, Hogg Lane (£45,000); H. Conolly, county architect, County Hall, Chelmsford.

Hatfield.—Secondary modern school, Wellfield Road; county architect.

Hemel Hempstead.—Flats (66), Adeyfield estate; Keel & Reay, builders, Swingate, Berkhamsted.

Herne Bay.—Houses (46), Greenhill; A. S. Wilson & Partners, architects to U.D.C., 8, Princes Street, Storey's Gate, Westminster, S.W.1.

Leicester.—Houses (56) and bungalows (6) for old people; city architect, Council Offices, Leicester.

London. — HOXTON. — Flats (144), Pitfield estate, for Shoreditch B.C.; borough engineer.

PADDINGTON. — T.A. Centre, Harrow Road; Middlesex T.A. Association, 59, Green Street, W.1.

STOKE NEWINGTON.—Flats (111), Portland Rise, for B.C.; Sir Robert McAlpine & Sons, Ltd., builders, 80, Park Lane, W.1.

Longbenton.—Houses (128) at Burradon for the U.D.C.; Wimpey & Co., Ltd., builders, Orchard House, Newcastle-on-Tyne.

Houses (32) on the Avondale site for the U.D.C.; G. Bainbridge, builder, 205 Westgate Road, Newcastle-on-Tyne.

Macclesfield.—Factory, London Road, Poynton; Stockdale Engineering, Ltd., 196, Deansgate, Manchester.

Middleton.—Houses (160), Brookside; W. F. Mitchell, Ltd., Middleton.

Mitcham.—Dwellings (155), Laburnum Road; borough engineer.

Newcastle-on-Tyne.—Additions to Montelland Cottage Homes for the City Council (£10,900); R. Bowey & Son, builders, Back Raby Street, Newcastle.

Houses (34), Kenton; J. H. Fisher & Co., Ltd., builders, Kenton Lane, Newcastle-on-Tyne.

Newcastle-under-Lyme. — New building at Enderley Street for Enderley Mills, Ltd.; Hollins, Jones & Oldacre, architects, Lloyds Bank Chambers.

Northfleet.—Shops and flats, Coldharbour Road estate; A. Beaumont, Ltd., builders, Bexleyheath.

North Riding.—Police houses at Thornaby and Northallerton; county architect, County Hall, Northallerton.

Nottingham. — Houses (120), Fernwood estate for T.C.; Thos. Bow, 45, Lamartine Street, Nottingham. Houses (134), W. J. Simms, Son & Cooke, Ltd., Haydn Road, Nottingham.

Ossett.—Houses (66), Manor Lane & Swithenbank; B. Freeman, town clerk, Town Hall.

Penistone.—Houses (20), Park Avenue site, for U.D.C.; Hey & Murfin, Ltd., Summer Lane, Wombwell.

Portsmouth.—Houses (132), Leigh Park; city architect.

Rainford.—Houses (24), Festival Road site; U.D.C. surveyor.

Rochdale.—Houses and flats (111), Kirkholt estate, for T.C.; J. Hobson & Sons, builders, Newark Street, Nottingham.

Runcorn.—Houses (169), garages, and block of 3-storey flats at Town Hall estate, Section 3, for U.D.C.; A. B. Cunningham, surveyor.

Salford.—Flats (36), at Devonshire Road site for T.C.; C. Musker Bros., Ltd., Swinton (£49,748.)

Scarborough.—Alterations and additions to Sportsdrome, Sandyside for T. Round & Son; Wilkinson & Smith, architects, Martins Bank Chambers.

Scunthorpe.—Houses (16), on various corner sites on new estates for T.C.; borough architect, Council Offices.

Seisdon.—Houses (16) at Jenks Avenue, White Hill for R.D.C.; W. Basterfield, Ltd. (£20,663).

Shardlow (Derby).—Houses (30), off Stevens Road, Sandiacre (£41,466), for R.D.C.; Sherwin Building & Contracting Co., Ltd., Stapleford.

Totton.—Secondary grammar school; Hants county architect, The Castle, Winchester.

Wallasey. — Leasowe Secondary Modern School (£100,000) for E.C.; borough architect.

Welwyn Garden City.—Additional factory premises; Murphy Radio, Ltd.

West Bromwich.—Proposed factory, Bromford Lane; Midland Washer Works, Ltd., Great Bridge, Tipton.

Winchester.—Houses (100), Weeke Manor estate; A. S. Wilson & Partners, architects to T.C., Princes Street, Storey's Gate, Westminster, S.W.1.

ELECTRICAL REVIEW

UNIVERSITY OF MICHIGAN
JUL 15 1952
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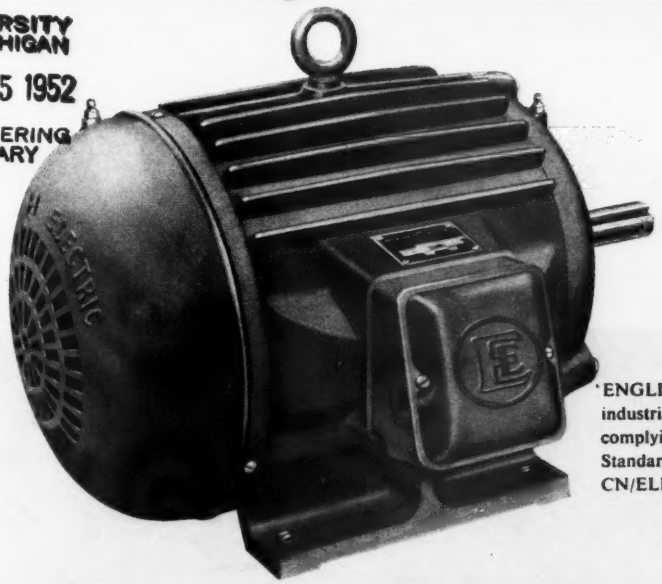
The new LY range of standard motors



'ENGLISH ELECTRIC' industrial motors complying with British Standard Draft Specification CN/ELE/6814.

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industrial motors

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Industrial Motor Works, Bradford
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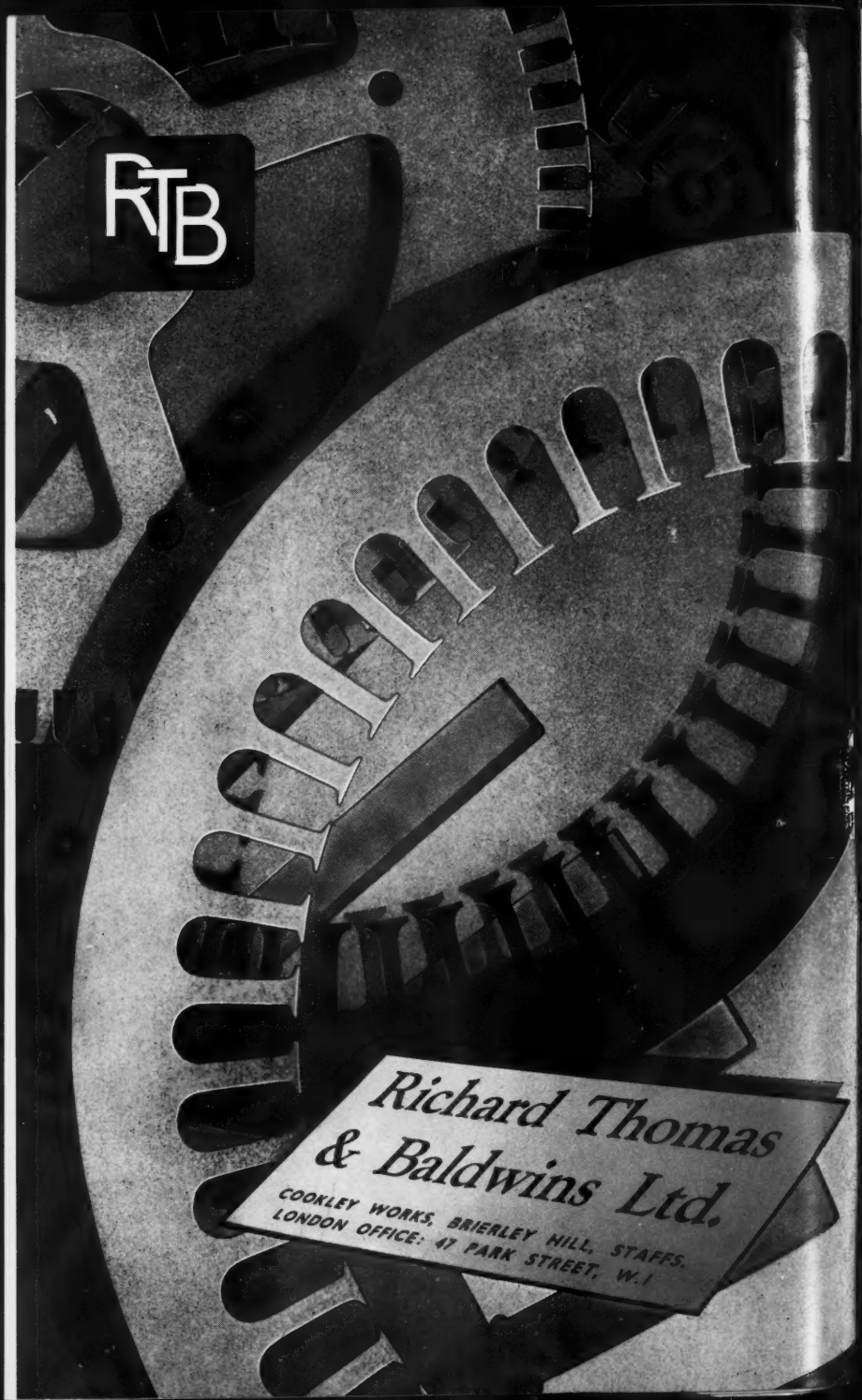
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COOKLEY WORKS, BRIERLEY HILL, STAFFS.
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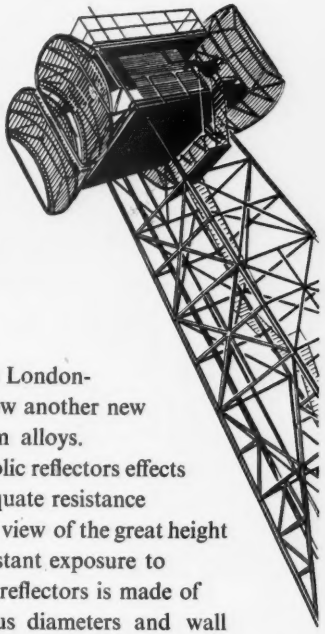
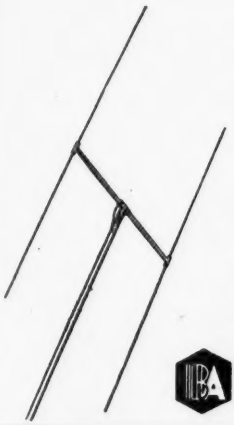
Paraboloids designed by the General Electric Company Ltd., and constructed by Blackburn and General Aircraft Ltd., to specifications laid down by the Engineering Department of the G.P.O.



aluminium and television

Receiving and transmitting aerials on the London-Birmingham television radio-relay link show another new and interesting application of aluminium alloys. Aluminium fabrication of the large parabolic reflectors effects a great saving in weight and ensures adequate resistance to corrosion—two all-important factors in view of the great height at which they are mounted and their constant exposure to wind and weather. The structure of the reflectors is made of BA.21 aluminium alloy tubing of various diameters and wall thicknesses and also includes some castings of 3L33, a 10-13% aluminium-silicon alloy. On the domestic side, BA 21-H is in great demand for H type receiver aerials. The Development and Technical Service Sections of The British Aluminium Company will gladly give advice on the applications of aluminium and its alloys.



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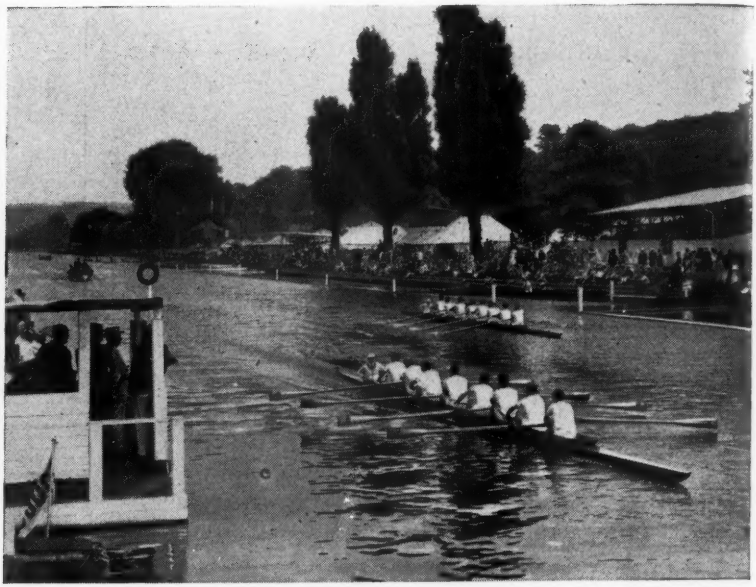
British Sporting Events



Henley — *Regattas for Boat Races were first introduced in 1775 and this principal gathering of amateur oarsmen was instituted in 1839 and became Royal 1851. The course is 1 mile 550 yards and is protected by booms each side. It includes the Grand Challenge Cup instituted 1839, which never left England until 1906, and the Diamond Sculls until 1892 and 8 other events. It attracts the pick of English crews and its open events has competitors from Europe, America and Australia. Held first week in July.*

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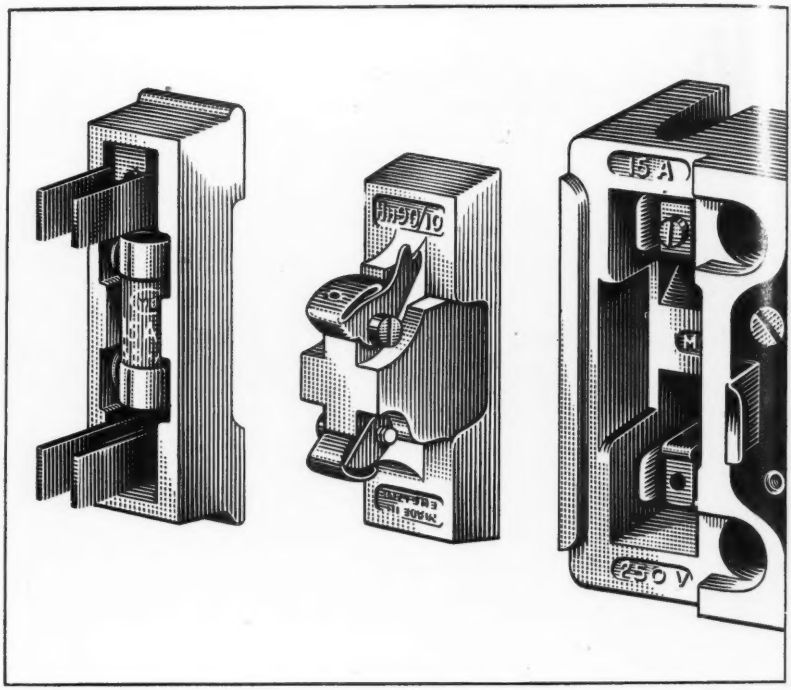

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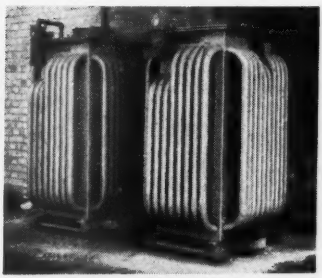

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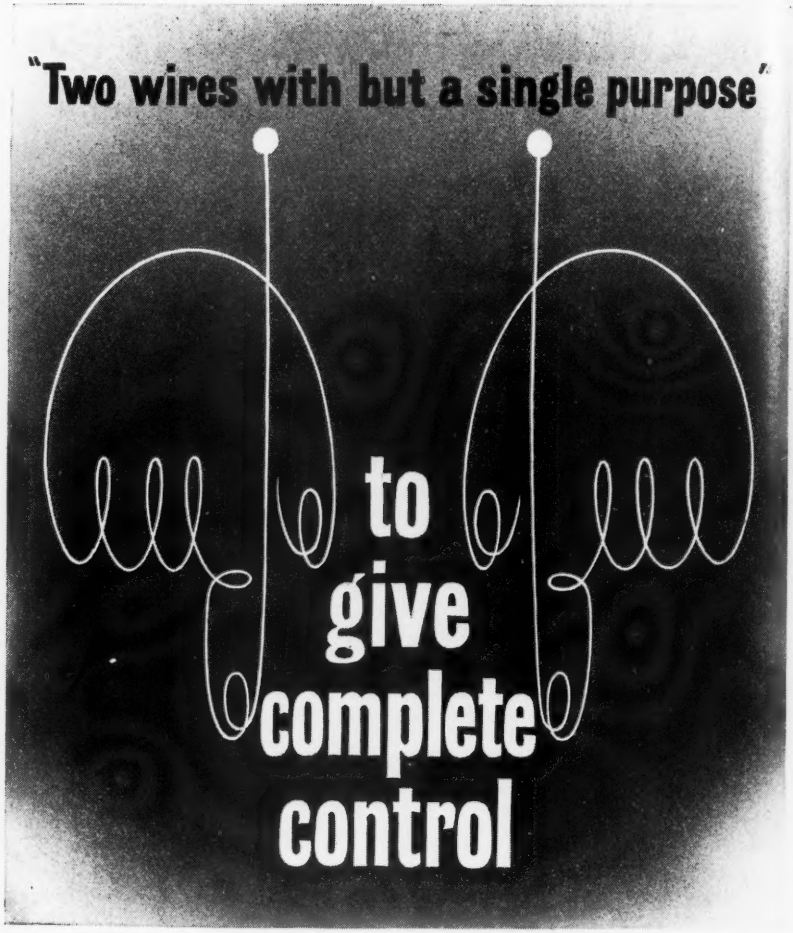

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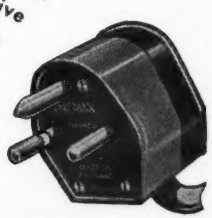

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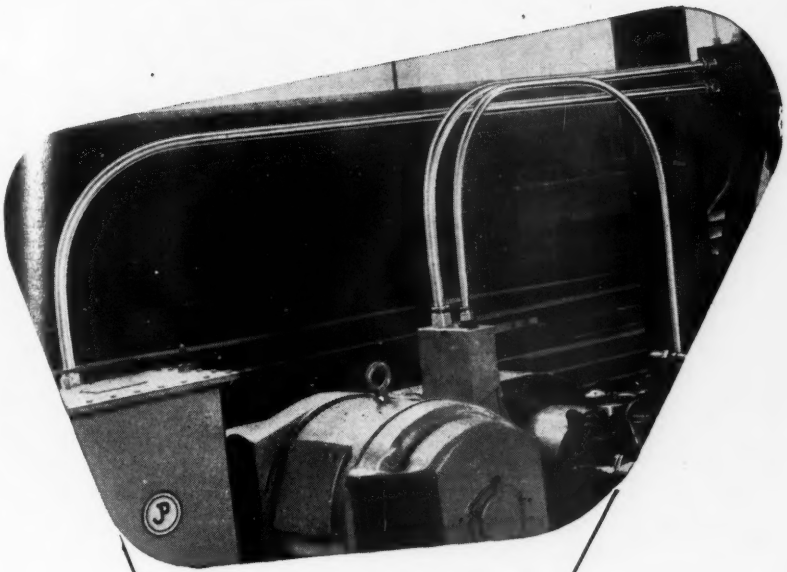

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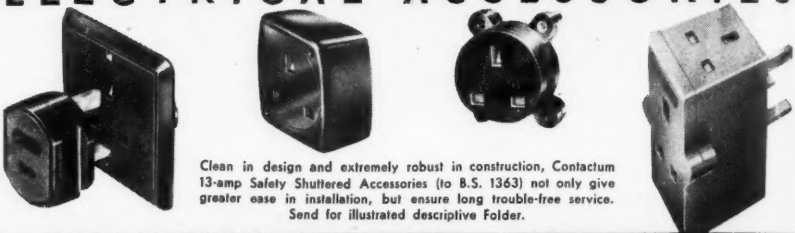

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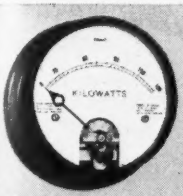

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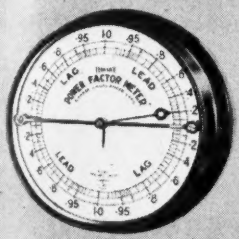

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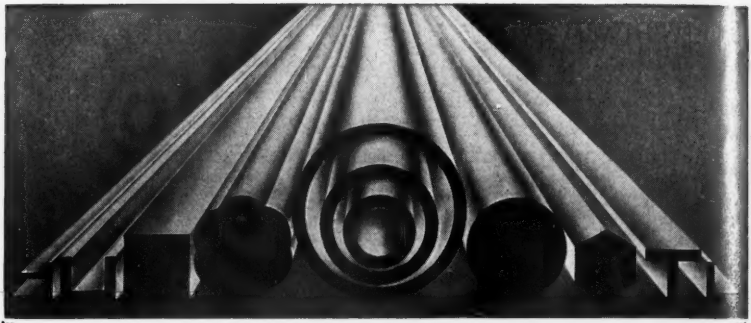

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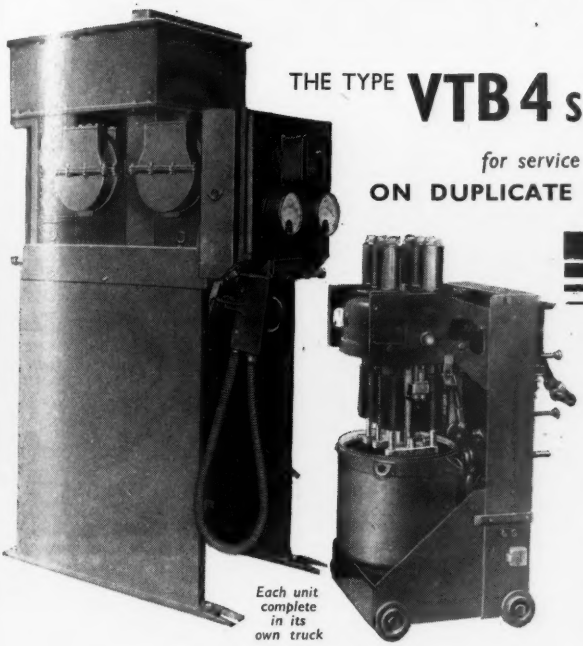

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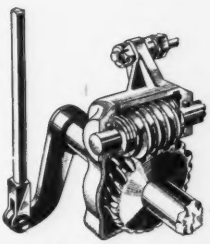

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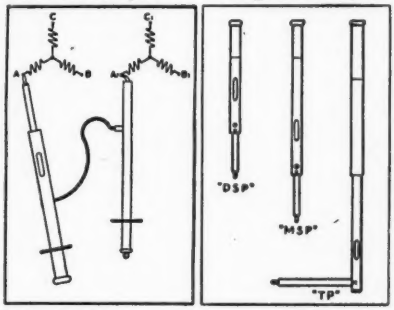

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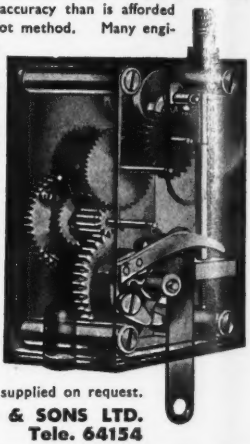

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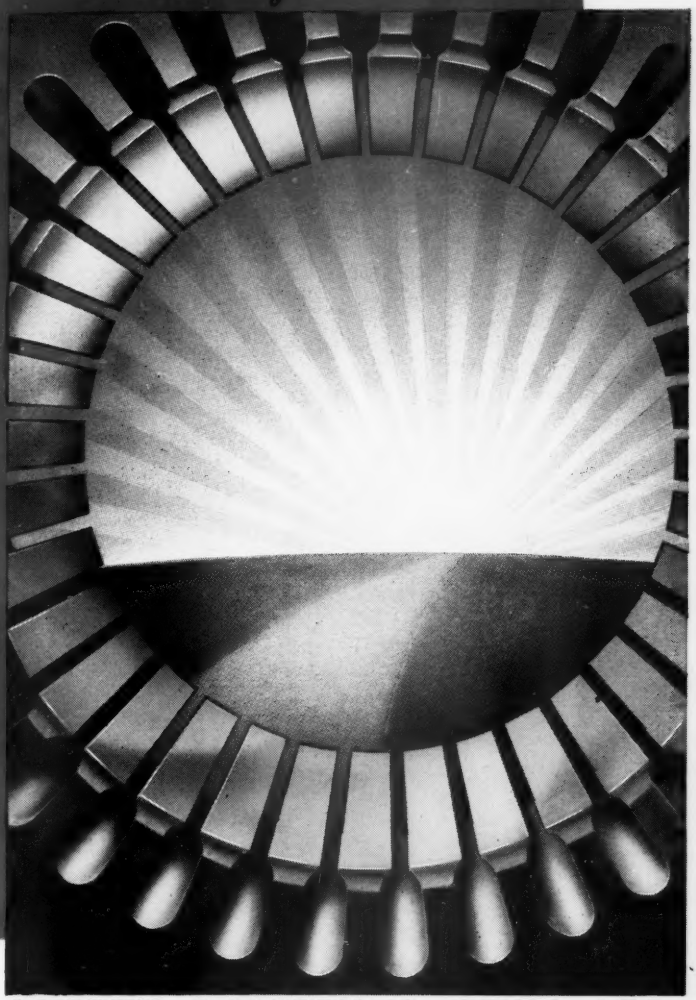

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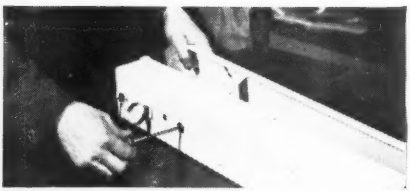

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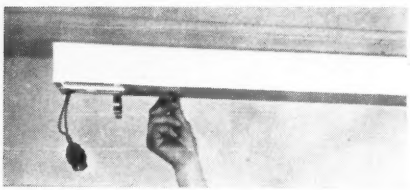

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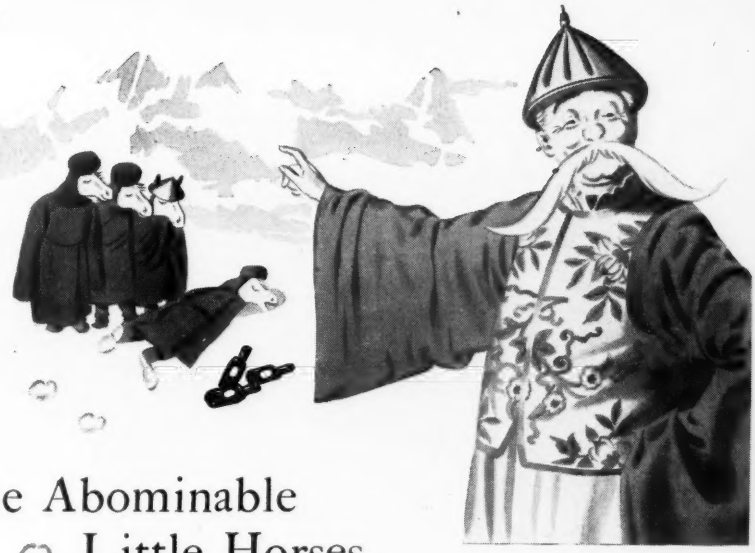

The Abominable Little Horses

"Abominable Snowmen" my foot—said the M.D. They are merely my Little Horses undergoing one of our usual tests. First they run up to the top of Everest and then they run down again backwards. This we call the *Rarefied Atmosphere Test* (Going and Coming). In other parts of the world my Little Horses are on test in deserts *(Coolth)*, under water *(Humidity)* and in Underground Railway Carriages *(High Pressure)*. Also in Selected Government Departments *(Cutting Red Tape)*.

I strongly resent these attempts to capture my Little Horses, particularly by intoxicating them with *Chang*, which I understand to be a sort of Tibetan Barley Beer. In short —shouted the M.D. suddenly turning deep purple—I will thank all Abominable Climbers and Abominable Explorers and all other Abominable Busybodies to ***Leave My Little Horses Be.***

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DESOUTTER BROS. LTD., The Hyde, Hendon, London, N.W.9. Phone : Colindale 6346 (5 lines) Grams : Despnuco, Hyde, London
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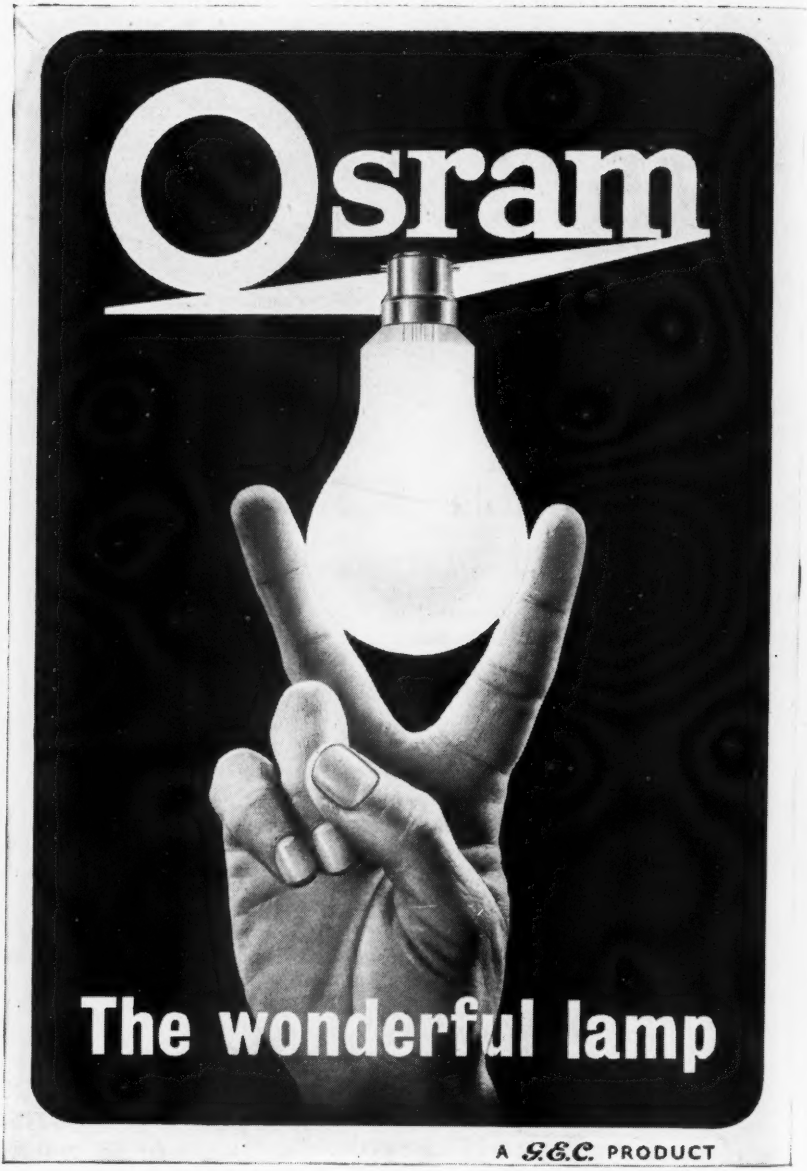

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"It's beautifully clear, Mr Ash."

And very strong too, Mr Downs."

It's like the lens ring for an electric torch we made recently, Mr Ash. That had to be completely transparent, perfectly accurate, and at the same time decorative and strong enough to stand up to rough treatment."

"How did you manage all that, Mr Downs?"

"It was moulded in clear Polystyrene, Mr Ash. The strengthening shoulder round the moulded screw thread was formed at the same time into a relief pattern of circular bosses. All made in one operation, Mr Ash."

"So now the customer has seen the light, Mr Downs."

"He has indeed, Mr Ash. He said

If you want to know what plastics can do for you

ask Ashdowns

ASHDOWNS LIMITED

ECCLESTON WORKS, ST. HELENS, LANCS. Phone: St. Helens 3206. *Ashdowns Ltd. is a subsidiary of Pilkington Brothers Ltd.*

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6. Radio and Rectifier valve cooling.
7. Ventilation of confined spaces.

These typical uses by no means exhaust the almost limitless possibilities of these versatile and adaptable units.

This is worth investigating. Write for Illustrated Leaflet 104/37E

HIGH velocity blowing and suction problems are reduced to a minimum with these light-weight, compact units. They give static pressures up to 33 in. water lift, and free air is delivered at volumes up to 140 c.f.m.

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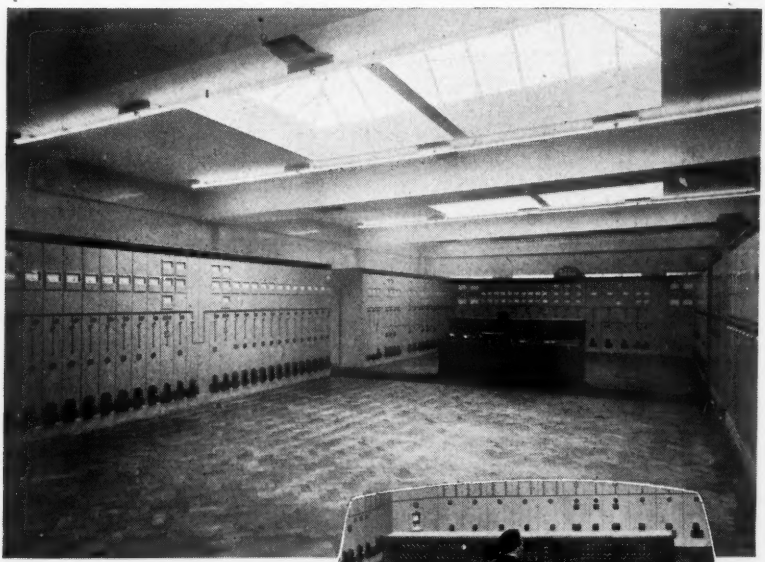

Consulting Engineers,
Messrs. McLellan and Partners

THE CONTROL ROOM AT ABBEY STEEL WORKS

The control room at Abbey Works, with Reyrolle switchboards for the remotely controlled switchgear in the Works, is a good example of an industrial installation. The instruments have clean, open and readable scales with well defined pointers. The control switches are simple to operate. The system diagram with its mimic semaphores reproduces the switching conditions faithfully.

All apparatus not required for control purposes is dissociated from the panels and the colour scheme both for the panels and the control room is carefully selected to create a pleasing and restful atmosphere.

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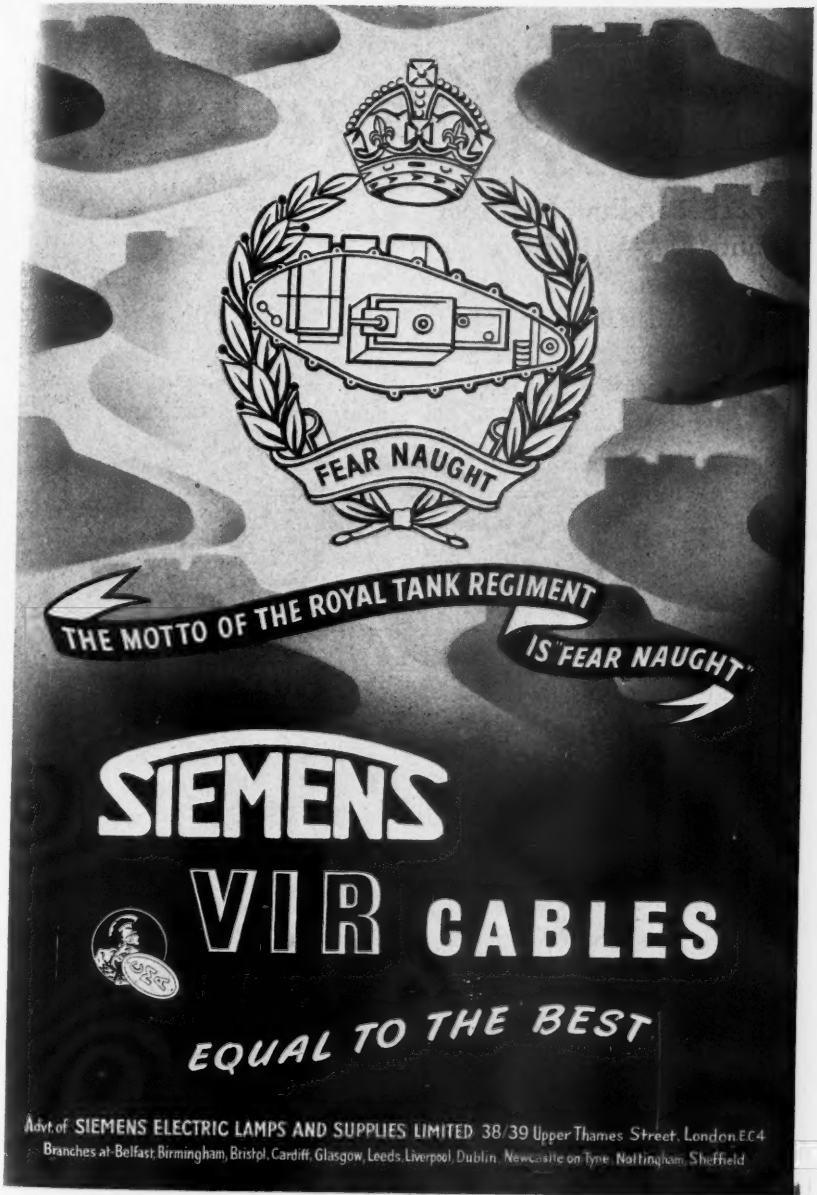
• • • talk to Reyrolle

CRC21S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page 600

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175-h.p. GREENWOOD & BATLEY, for 220 V. D.C. Compound interpole, 370 r.p.m., 740 amp.

Three 60/70-h.p. G.E. of America, for 230 V. D.C. Drip proof frames, endshield B/R.B., speed on load variable 1,000–1,500 r.p.m. Can be used on supply voltage not exceeding 325 with some increase in horse power.

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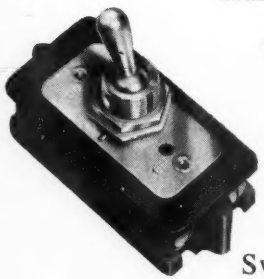

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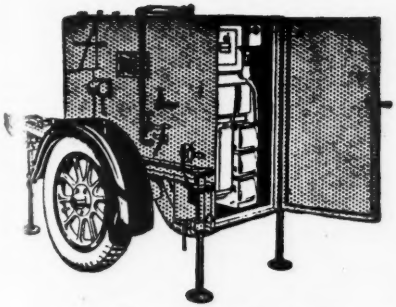

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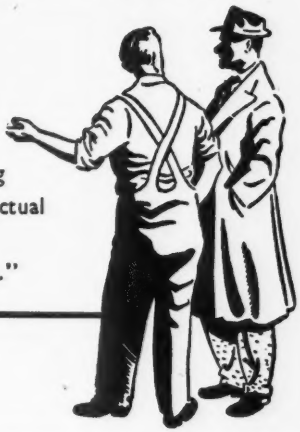

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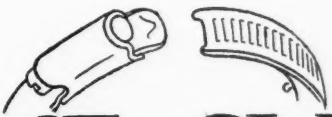

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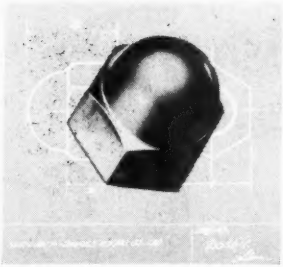

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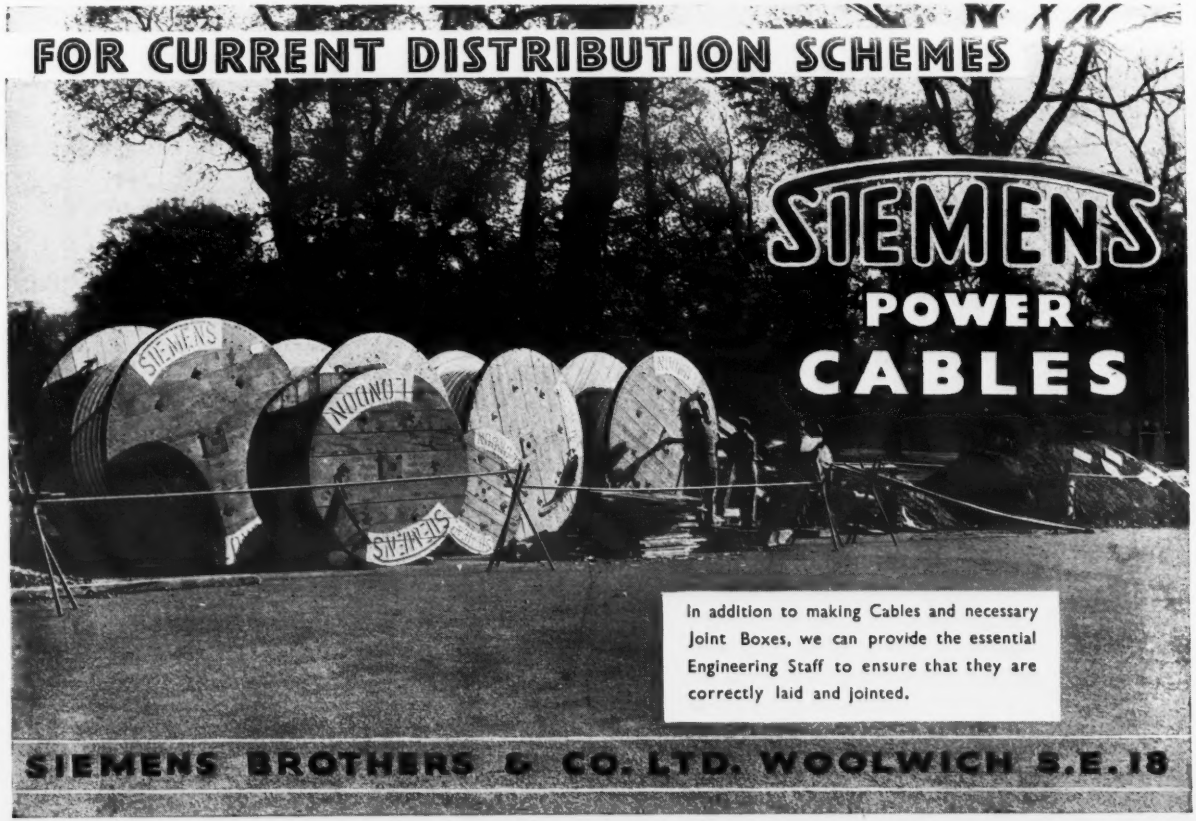
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Flameproof
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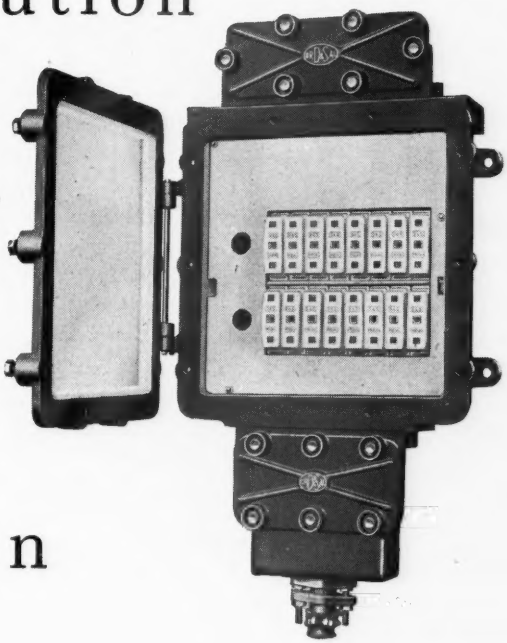

The above illustration shows a 660 volt machined joint flameproof distribution fuseboard, suitable for either HRC Cartridge fuses or rewireable fuses.

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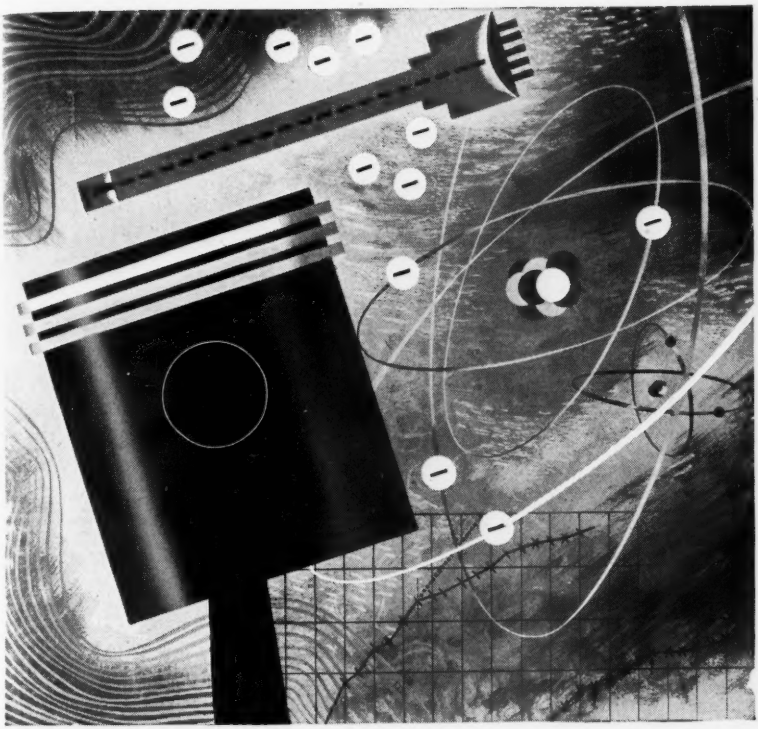

Atomic detectives

Metal wear is no new problem, but its study at Thornton has been transformed by the use of radioactive isotopes. These are the atomic detectives of science. They record the slightest fingerprint of wear.

In a test now proceeding, a radioactive piston ring fitted in an experimental engine is supplying valuable data on the *rate* of wear. Wear on the piston ring removes minute particles of radioactive metal which are carried away by the lubricating oil. As the oil returns to the sump of the engine it passes a Geiger Counter, which records the presence of radioactive metal.

In another test, a length of wire is drawn vertically through a tungsten carbide die which has been made radioactive. Normally, the wear on the die using different wire-drawing lubricants is measurable only when about two miles of wire have been drawn, but with the aid of radioactive tracers, which are transferred from the die to the wire, the radioactivity of the wire can be assessed by means of a Geiger Counter. By this method it is possible to measure 0.00000002 grams of die wear per foot length of wire.

These are two examples of how work on the atom has given into the hands of Shell lubrication experts research aids that will give answers in weeks instead of years. To you that means even better performance from even better Shell lubricants. To industry it means a narrowing of the time-lag between the invention of new machines and the development of lubricants to suit them.

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SHELL

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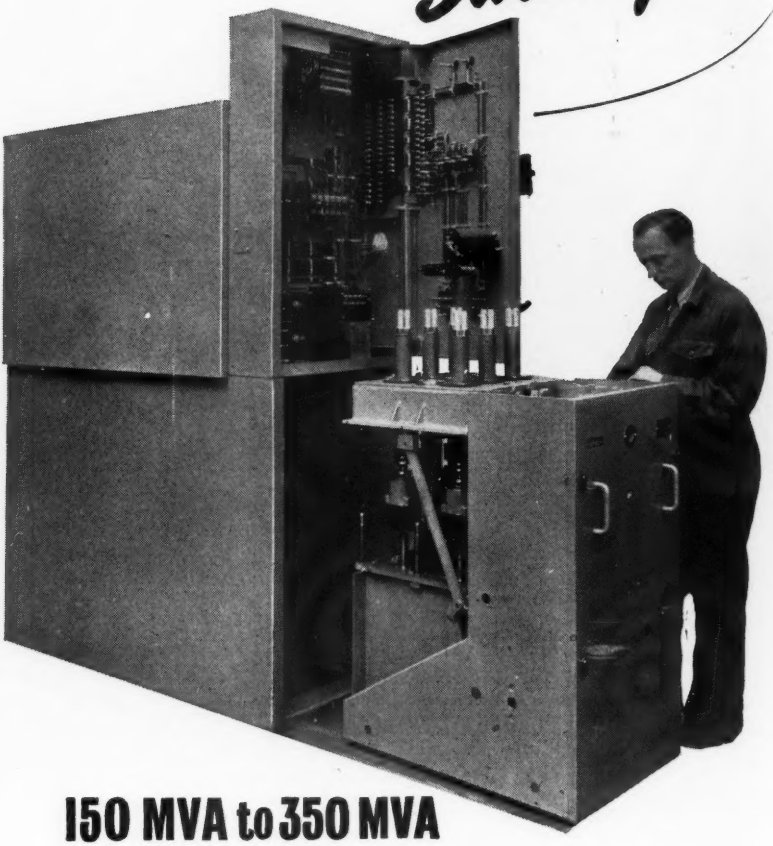
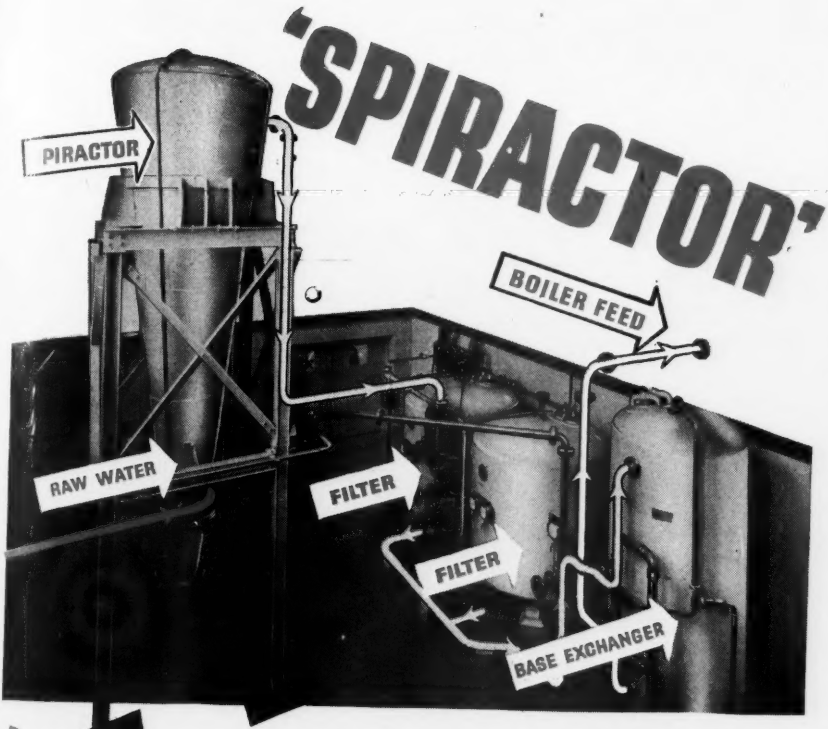
G.E.C.

Metalclad Switchgear



150 MVA to 350 MVA
3·3 kv to 11 kv

THE GENERAL ELECTRIC CO. LTD., MAGNET HOUSE, KINGSWAY, LONDON, W.C.2



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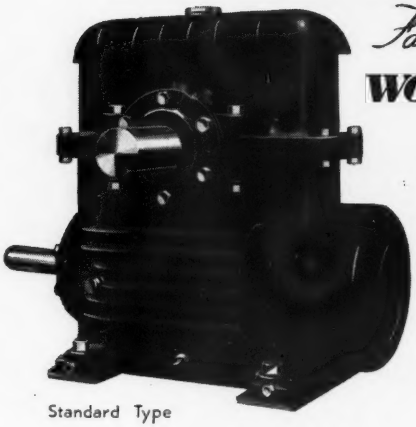

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Standard, Inverted and Vertical types.
Horse powers from fractional up to 400 H.P.
Gear Ratios up to 100 to 1.
Output speeds from 2·5 to 300 R.P.M.
Other Ratios supplied to meet requirements.

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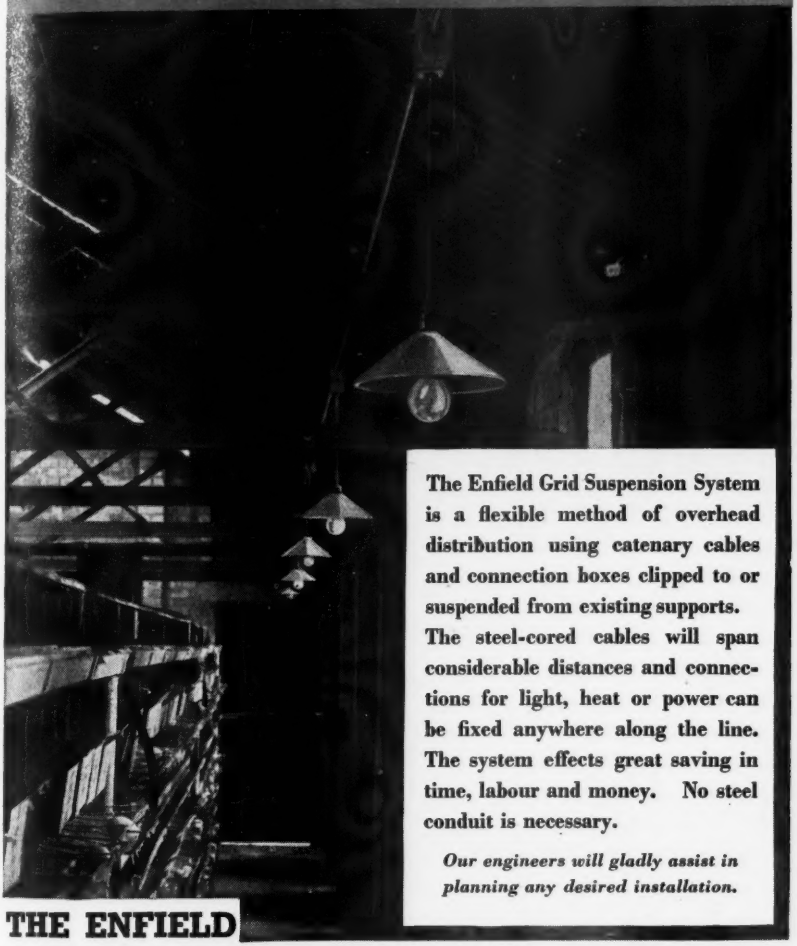

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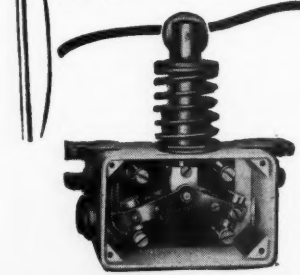

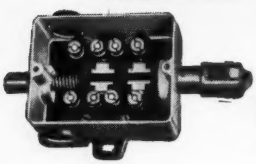

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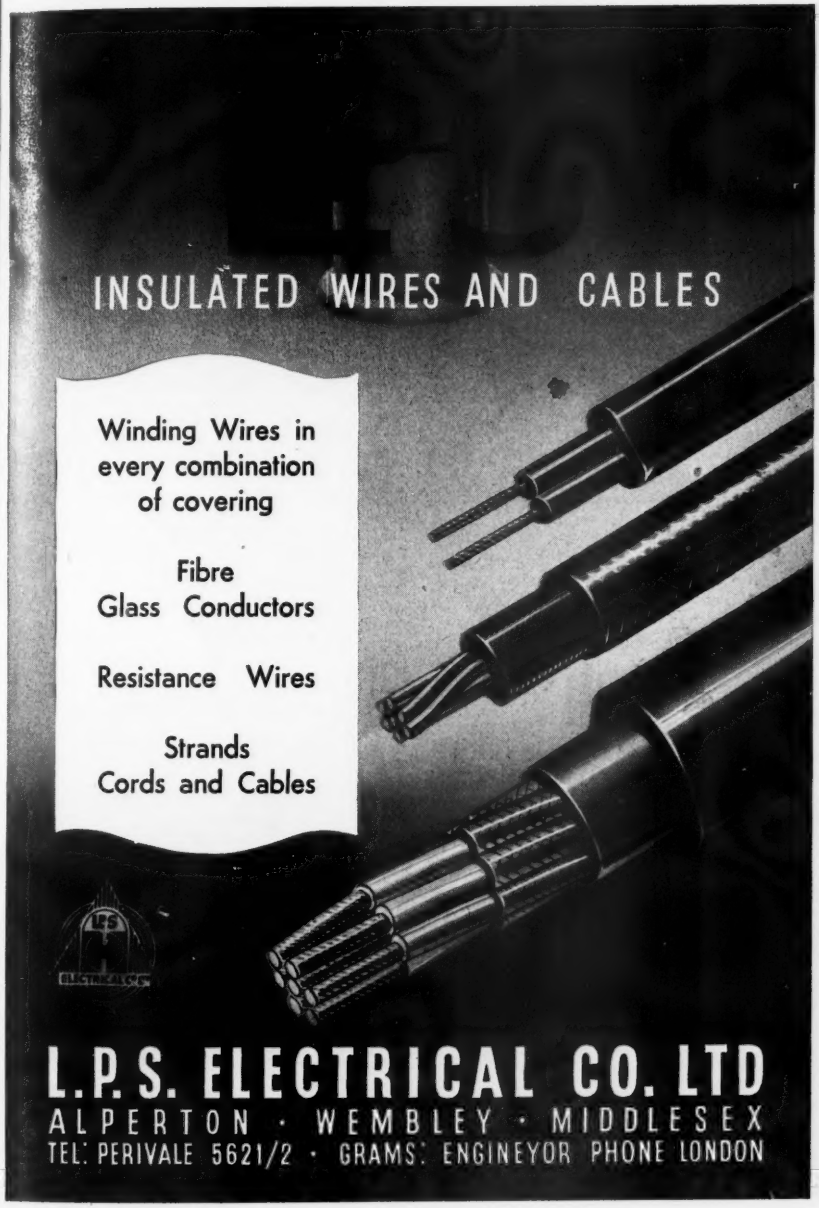
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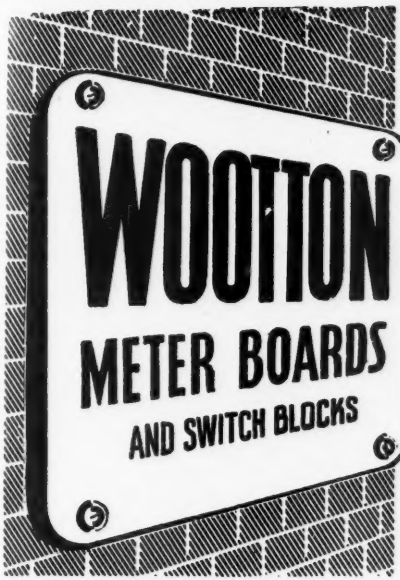

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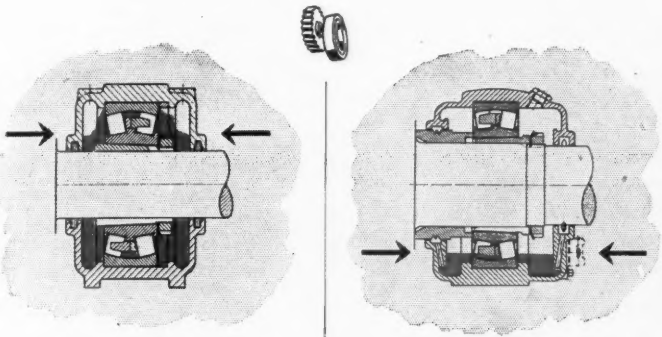

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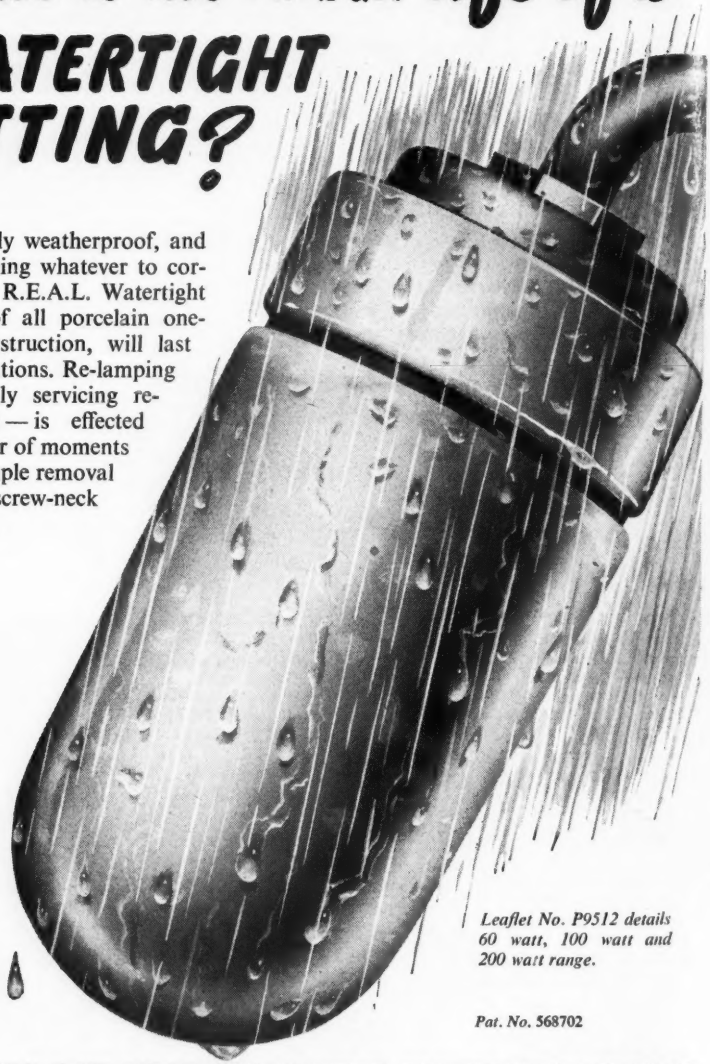

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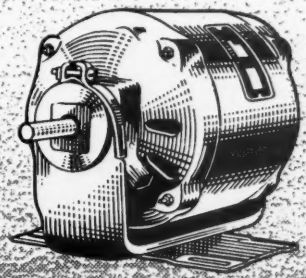

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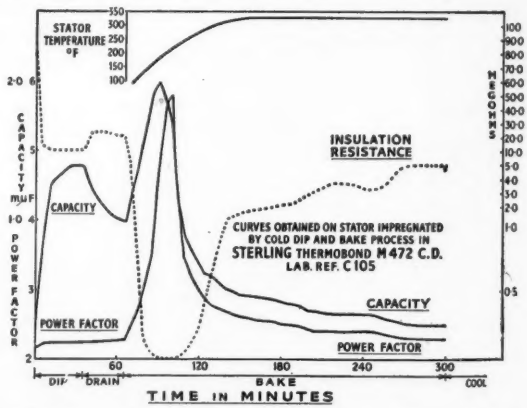

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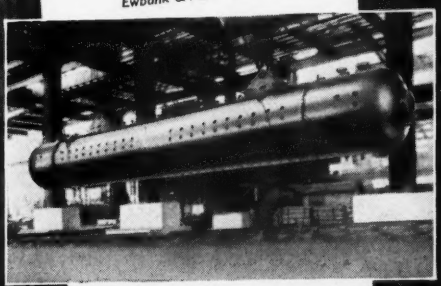

(Main illustration). Boiler during erection showing the walls of the superheater chamber (Inset illustration). Lifting the 65 ton fusion-welded steam drum for one of the Stirling boilers at Keadby.

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ELECTRICAL REVIEW

Vol. CL 27th JUNE, 1952 No. 3892

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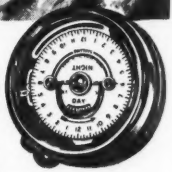

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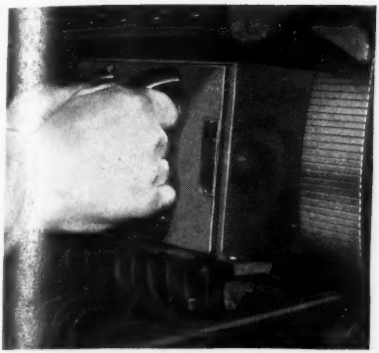

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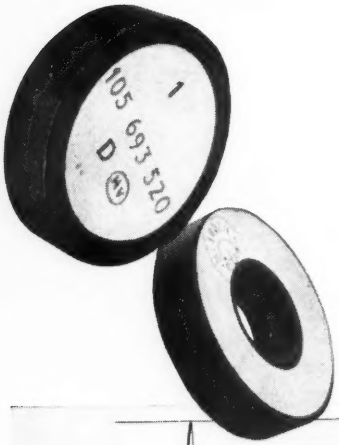
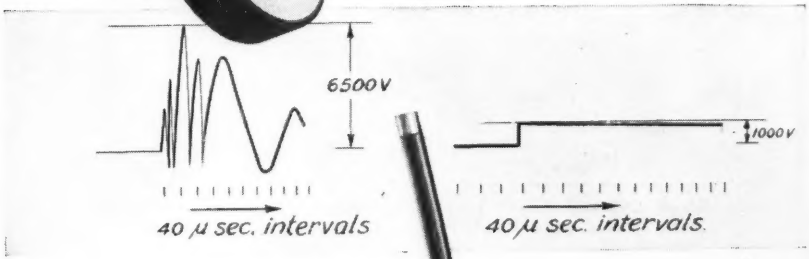


METROSIL

means protection against surge voltages



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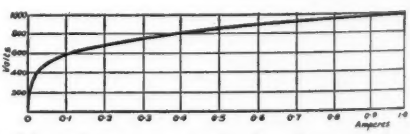

Relation between current and voltage for a typical "Metrosil" disc, examples of which are illustrated at the top of this page.

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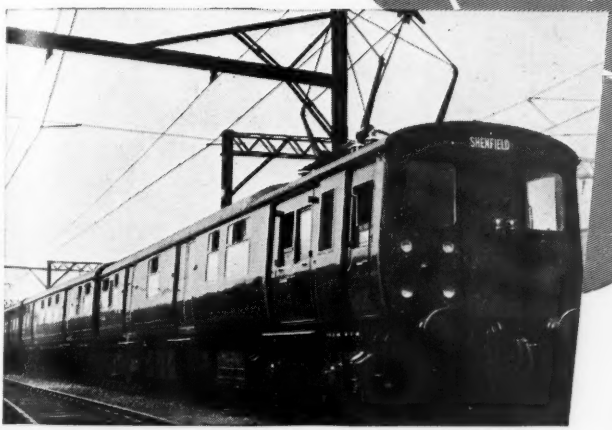

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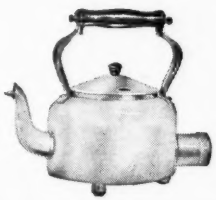

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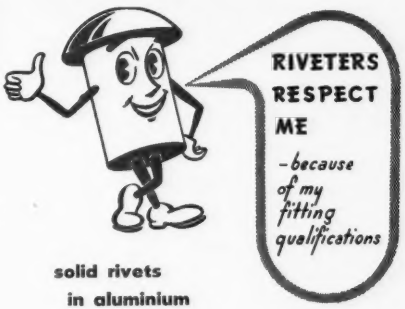

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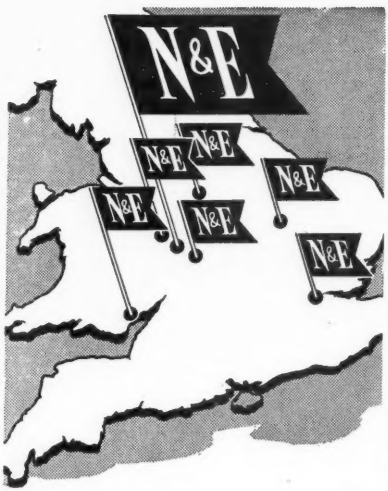

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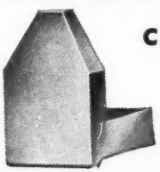

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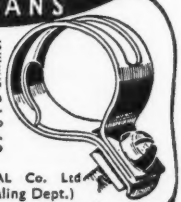

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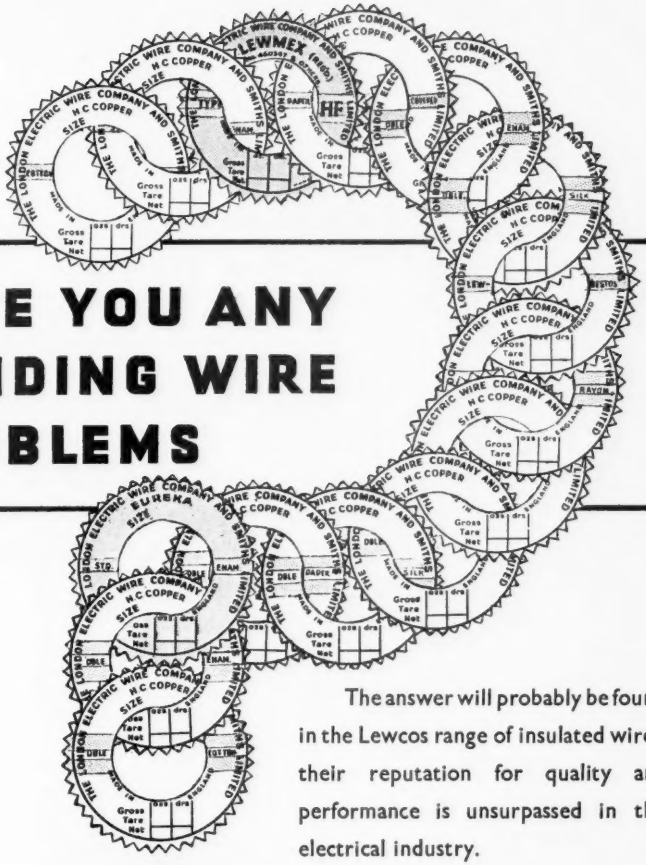

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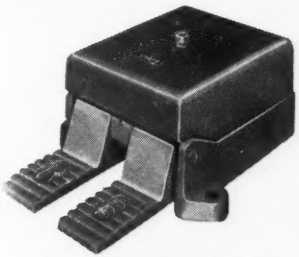

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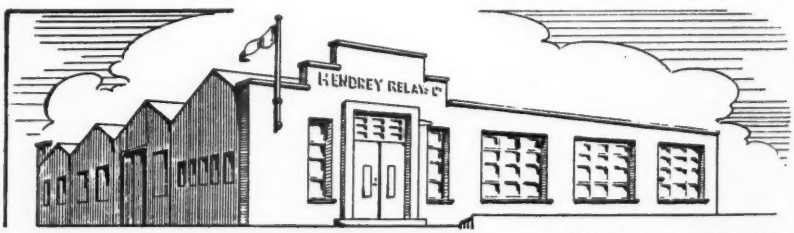

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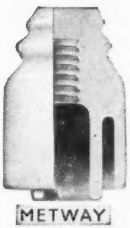

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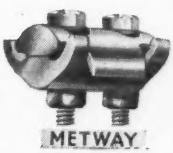

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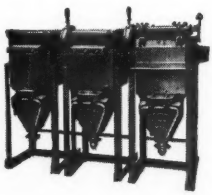

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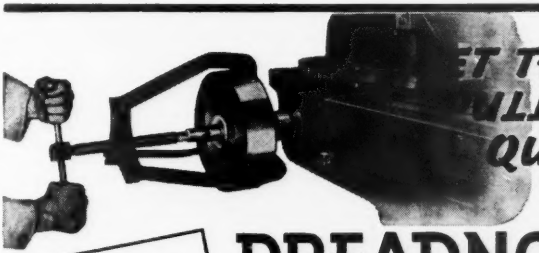

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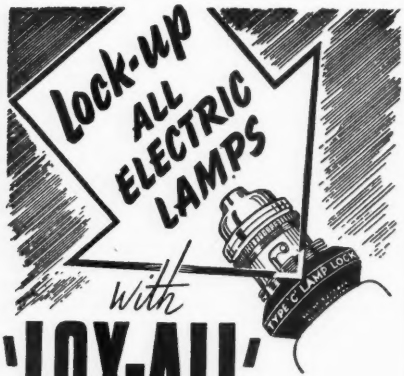

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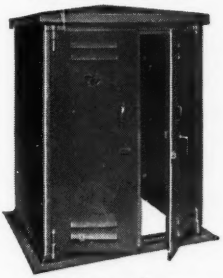

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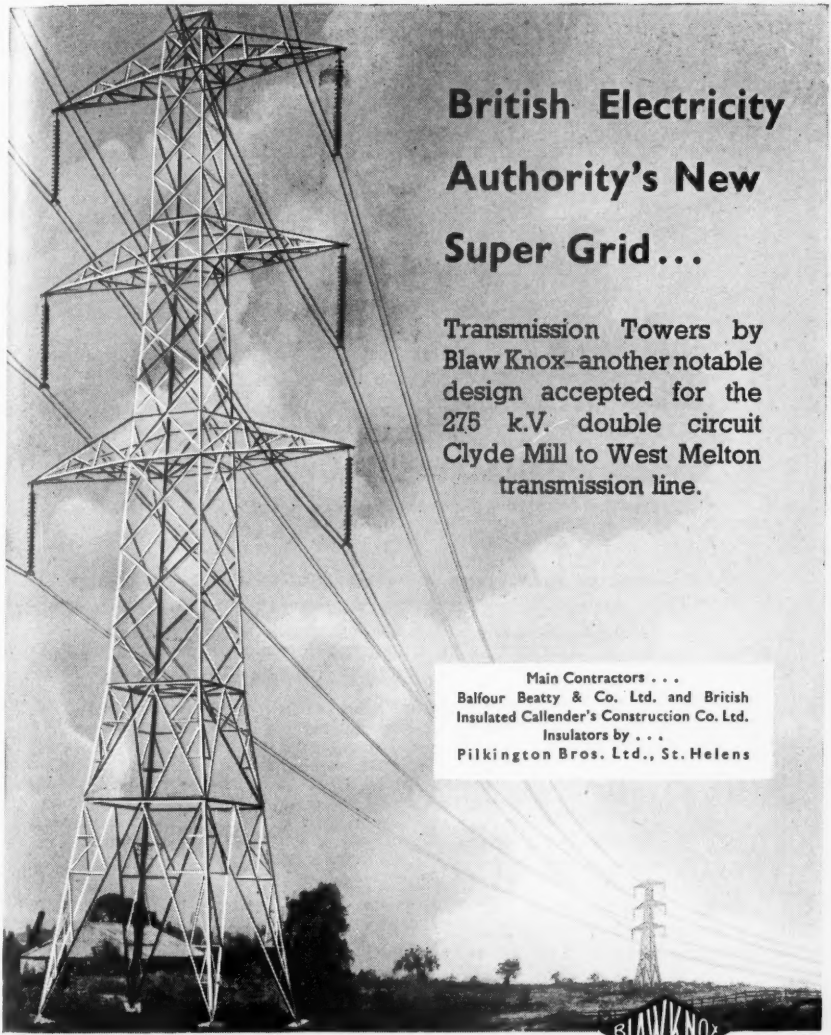
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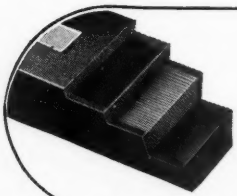

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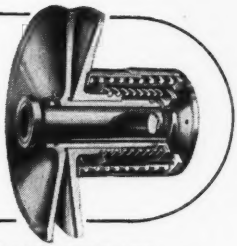

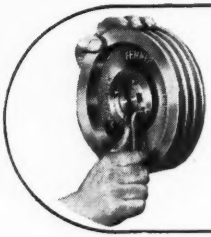

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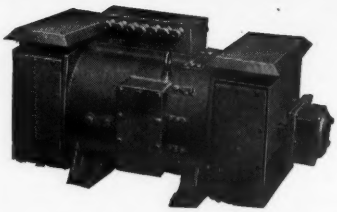

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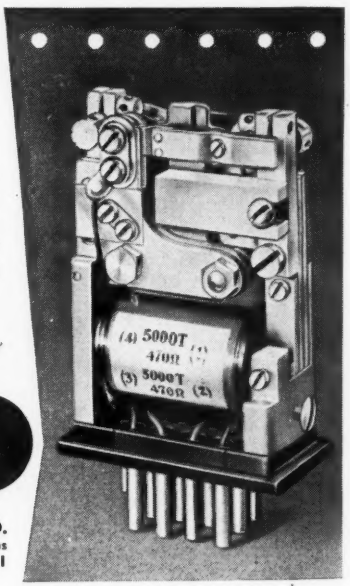

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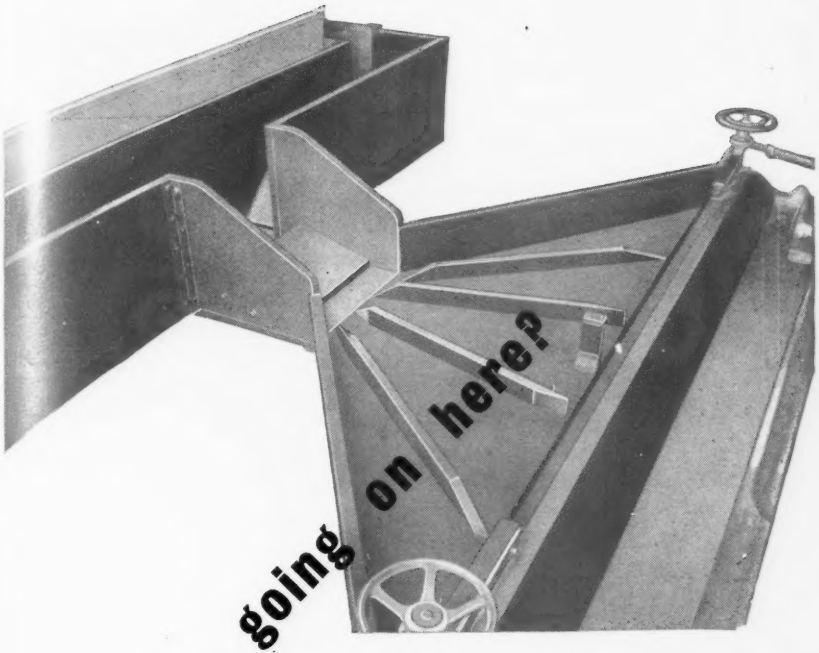

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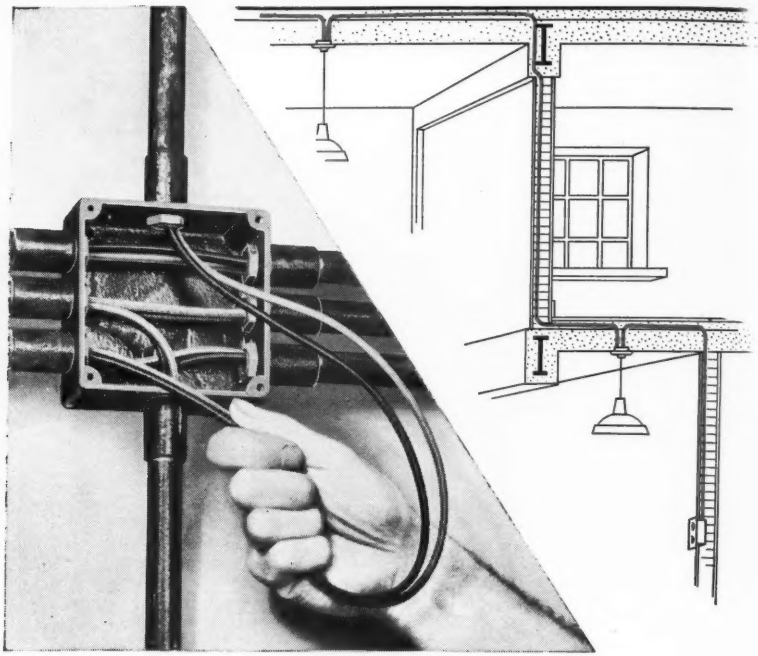

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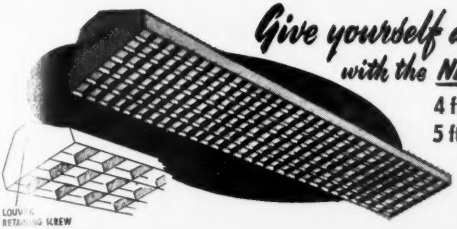

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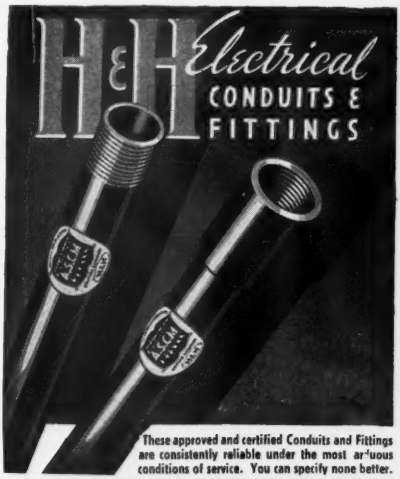

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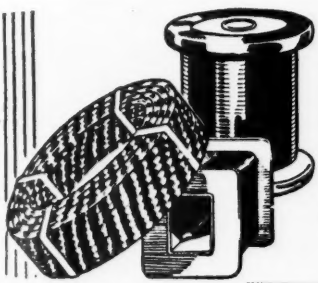

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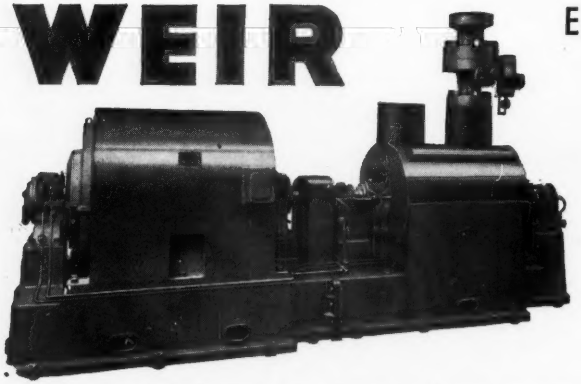

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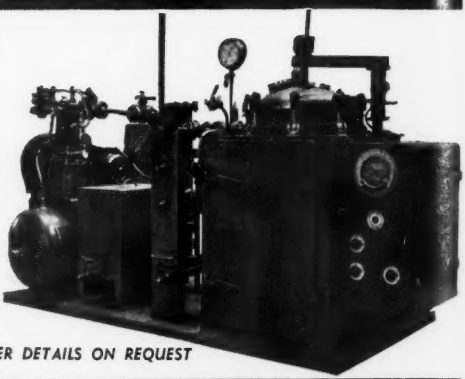

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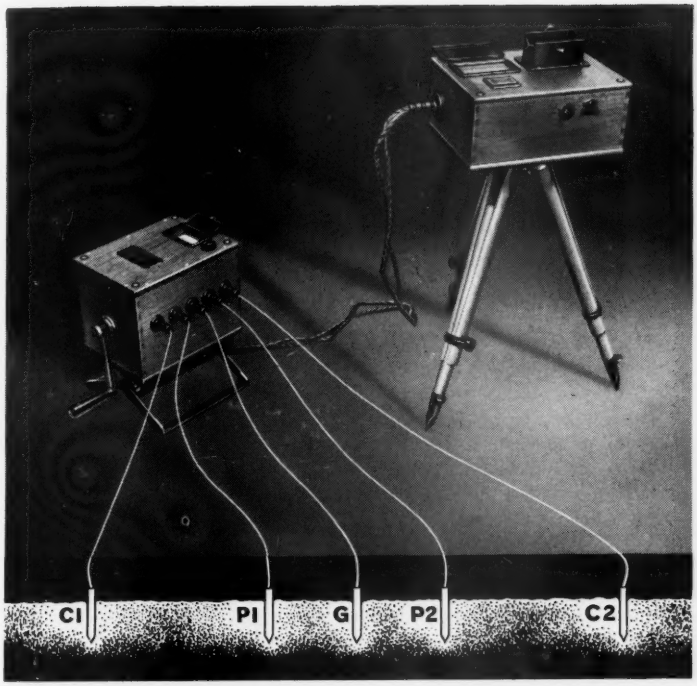

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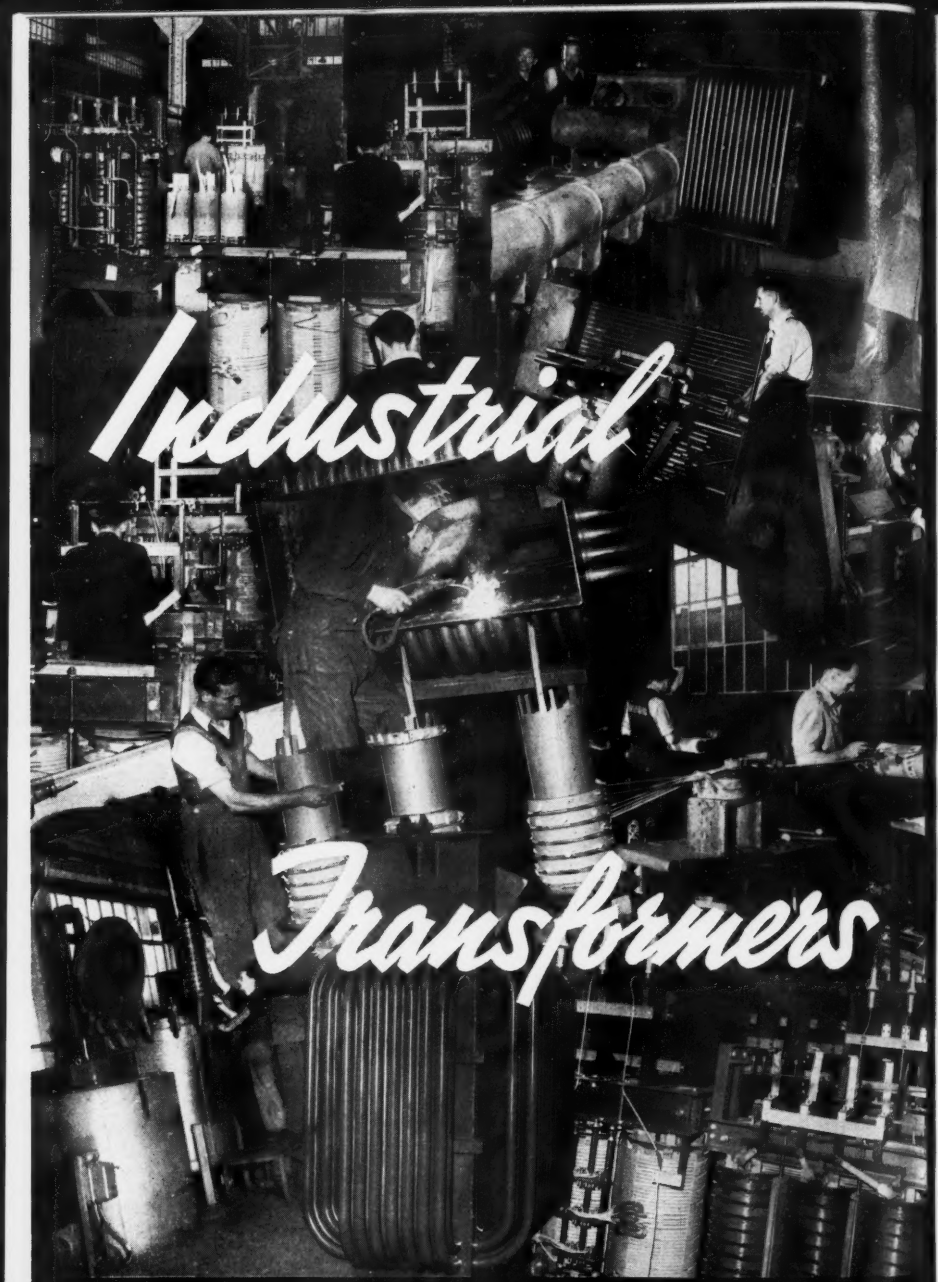

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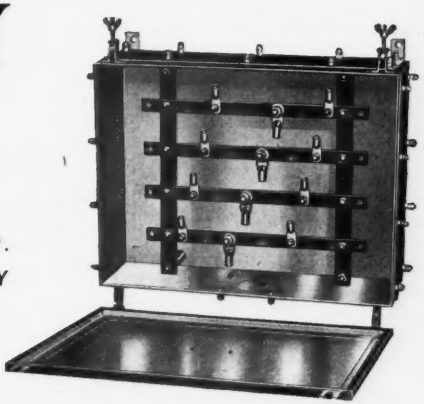

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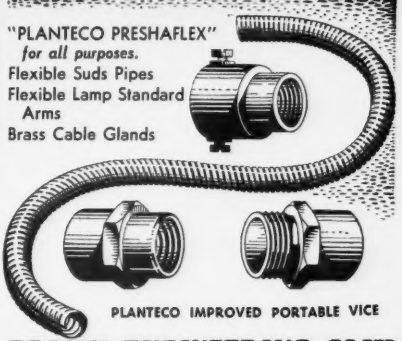

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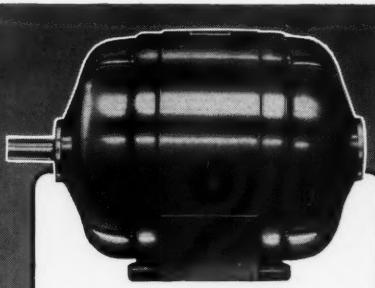

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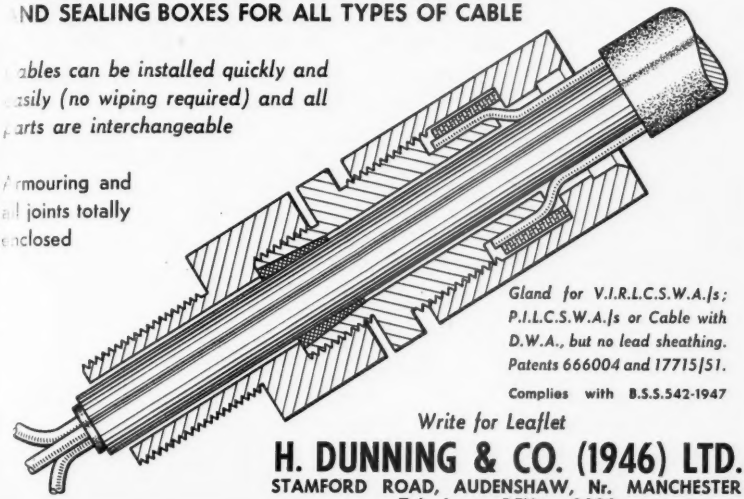

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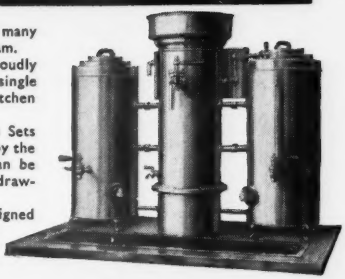

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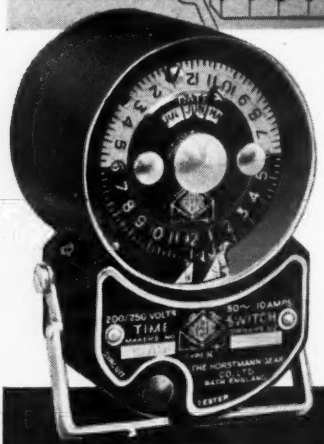

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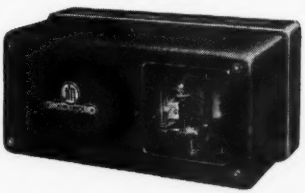

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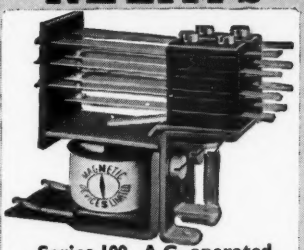

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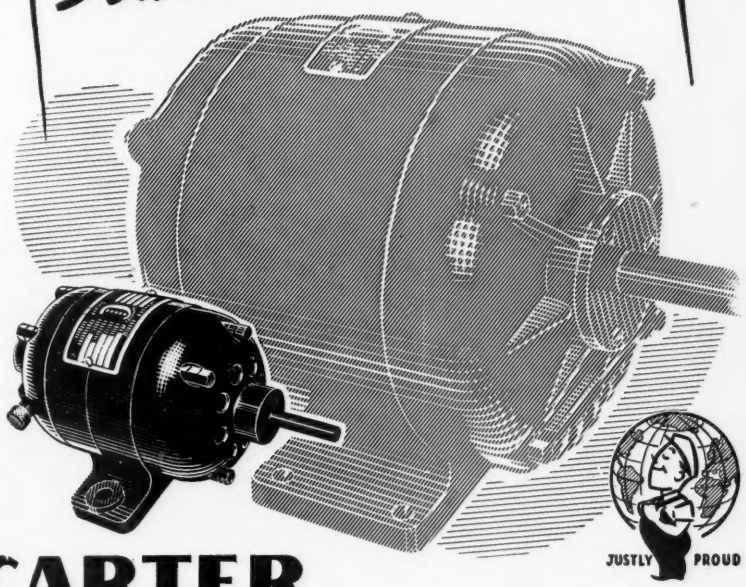

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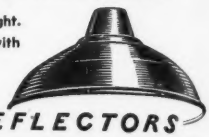

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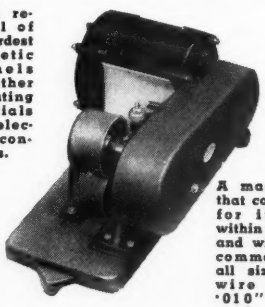

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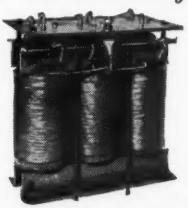

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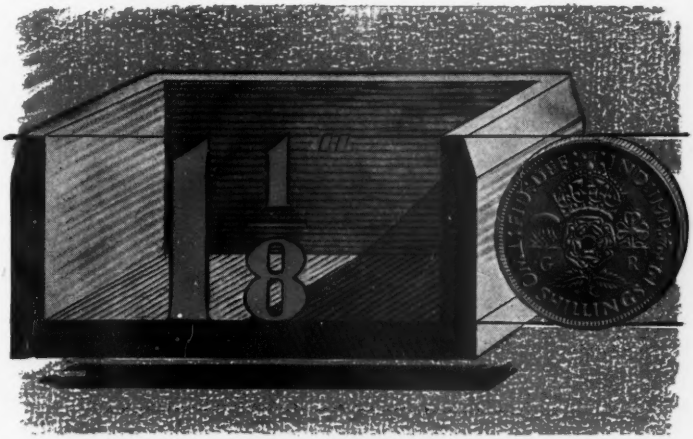

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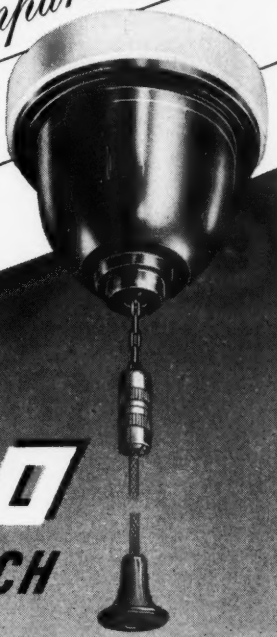

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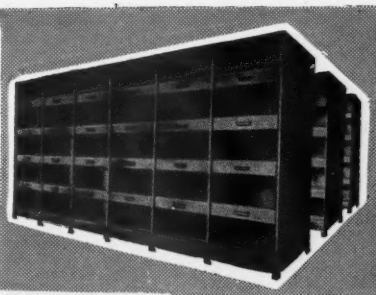

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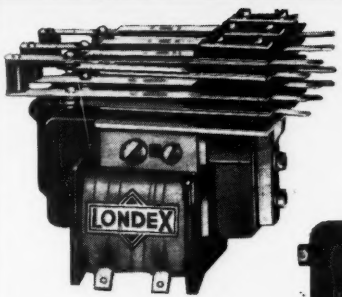

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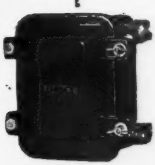

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Contact Collector Columns, Limit Switches, Overhead Collector Equipment, Winch Limiting Mechanisms for Skip Hoists, Cranes and Mechanical Handling Plants, Cable Reeling Drums]

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P.370

Vent-Axia
for Better Air Conditions

IN INDUSTRY
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Simplest form of controlled ventilation

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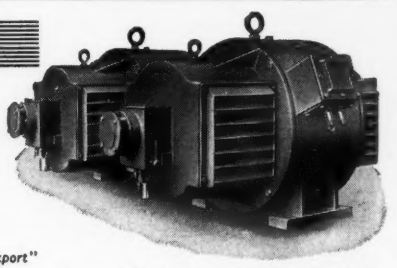
DYNAMOS and MOTORS
DAVID McCLURE LTD.
THE MERSEY DYNAMO WORKS
STOCKPORT

Telephone: Stockport 3653/4. *Grams: "Motors, Stockport"*



Louvred Marine Type Steering Gear Motors

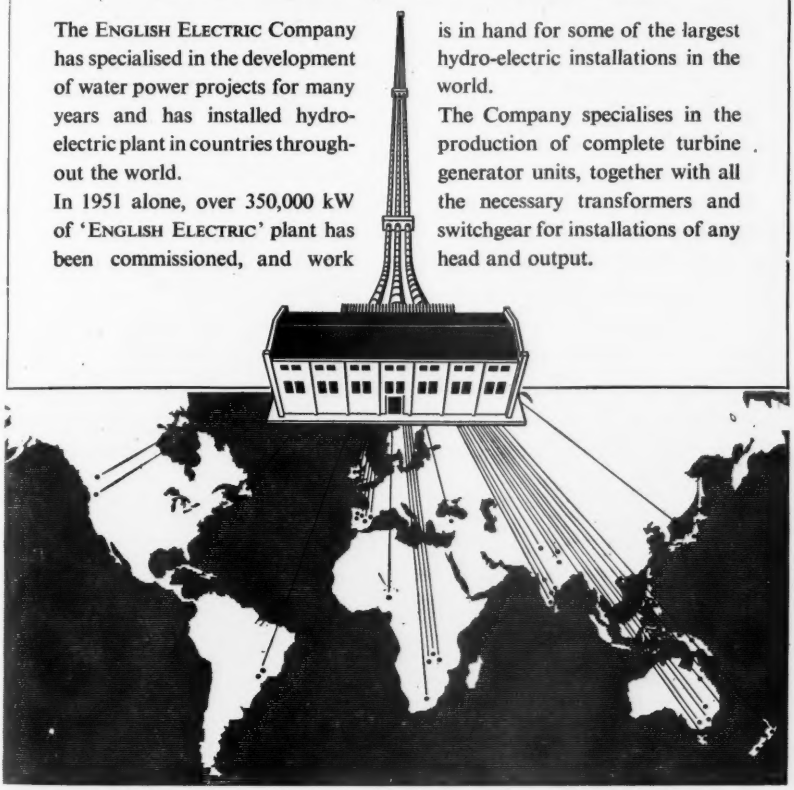
'ENGLISH ELECTRIC'
hydro-electric plant

Harnessing the World's Water Power

The ENGLISH ELECTRIC Company has specialised in the development of water power projects for many years and has installed hydro-electric plant in countries throughout the world.

In 1951 alone, over 350,000 kW of 'ENGLISH ELECTRIC' plant has been commissioned, and work is in hand for some of the largest hydro-electric installations in the world.

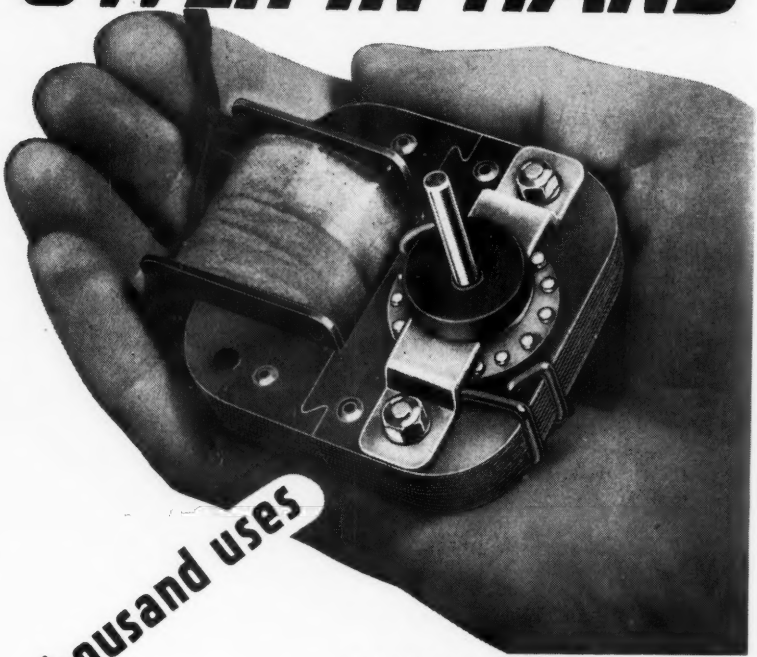
The Company specialises in the production of complete turbine generator units, together with all the necessary transformers and switchgear for installations of any head and output.



THE ENGLISH ELECTRIC COMPANY LIMITED, Queens House, Kingsway, London, W.C.2
Hydro-Electric Department, Stafford

HE.5 WORKS: STAFFORD · PRESTON · RUGBY · BRADFORD · LIVERPOOL · ACCRINGTON

POWER IN HAND



for a thousand uses

Shaded Pole Motor Type TPI.

This, the latest motor from the BSR factories has been designed to give the maximum efficiency with the minimum physical dimensions.

Specification

Voltage 200/250.	Frequency 50 cycles.	(Other voltages and frequencies to order.)
Starting Torque	1. 0 — 1. 5. inch ozs.	Depending on Temperature rating.
Full Load Torque	1. 2 — 2. 0. inch ozs.	
Mains consumption	10-15 watts.	
Speed (light)	2,900 R.P.M.	
Shaft Diameter	·1560" + ·0000 − ·0002	Weight 1 lb.
Dimensions $2\frac{1}{4}$" × $2\frac{7}{16}$" × $1\frac{7}{16}$".		External Shaft Length, 1 inch.

BSR

BIRMINGHAM SOUND REPRODUCERS LTD

Claremont Works, Old Hill, Staffs. Tel: Cradley Heath 6212/3.

The Contractor:

"Wolf HAVE ALL THE ANSWERS

BECAUSE—

PERFORMANCE
Time is the essence of every contract. The amazing all-round performance of Wolf tools will keep you well in advance of schedule.

MORE POWER WITH LESS WEIGHT
Wolf power-to-weight ratio is a revelation. The new 10" saw (type RS10) is streets ahead of others in power yet it weighs no more than an average lower capacity machine.

LABOUR SAVING
With rising labour costs, each pair of hands needs to be made more productive. Wolf's wide range of power tools is the surest way to greater-output-per-man-hour.

CRAFTSMEN'S CHOICE
Besides doing far more work in less time, Wolf Tools take all the drudgery out of the toughest jobs—and put more money into the operator's pay packet.

SPEEDY SERVICE
Wolf Tools are always on the job. When repairs or spares are needed it is a matter of hours instead of weeks. Wolf have all the answers !

Increased output-lower costs need Wolf ELECTRIC TOOLS

WOLF ELECTRIC TOOLS LIMITED
PIONEER WORKS · HANGER LANE · LONDON · W.5
Telephone: Perivale 5631-4
Branches: Birmingham, Manchester, Leeds, Bristol, Glasgow.

ARTHUR EDGE & CO. LTD.

FOXOAK WORKS, FOXOAK STREET, CRADLEY HEATH, STAFFS

Telephone:
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All classes of Steelwork for Electrical Power Overhead Line Construction

ENQUIRIES INVITED FOR STEELWORK AND DROP FORGINGS OF ALL DESCRIPTIONS

IT'S THE QUALITY THAT COUNTS

FLUORESCENT CONTROL GEAR by

CONTROL COMPONENTS LIMITED

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AND NOW . . .

THE CLC TERMINAL CLAMP

. . . and still it's CLICK!

. . . and it's fixed!

WHEN DEALING WITH US, IT'S Service Plus!

Automatic CLC Mid-Span

TERMINAL CLAMPS and CONNECTORS

CABLE COVERS LIMITED

ST STEPHEN'S HOUSE, LONDON, S.W.1

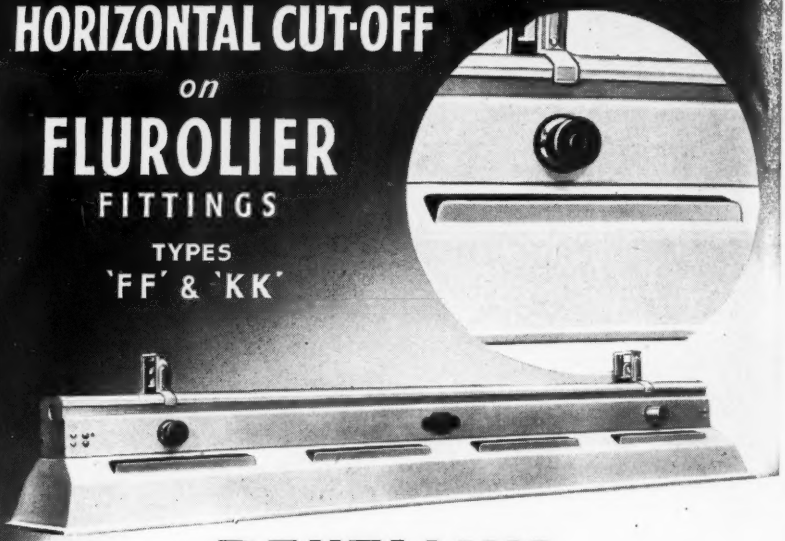
Telephone : Whitehall 3616 Elmbridge 7241 (5 lines)

And Now-UPWARD LIGHT WITH HORIZONTAL CUT-OFF

on

FLUROLIER FITTINGS

TYPES 'FF' & 'KK'



BENJAMIN Regd FLUROLIER FITTINGS

Here is the latest stage in the development of Fluroliers —to prevent glare—a further result of Benjamin's continuous effort to improve the technique of their industrial fittings design.

This distinctive and effective feature was first introduced in a vitreous enamel reflector by Benjamin in the Type 'HH' twin 5ft. Flurolier—it is now extended to the Types 'FF' and 'KK' for single 5ft. and 4ft. tubes.

THE BENJAMIN ELECTRIC LTD

(*Established* 1908)

Brantwood Road, Tottenham, London, N.17

Telephone: Tottenham 5252 (5 *lines*)
Telegrams: 'Benjalect, Southtot, London.'

BIRMINGHAM
5, Corporation St., Birmingham 2
Midland 5197

LEEDS
49, Basinghall St., Leeds 1
Leeds 25579

The Old Grammar School, Market Harborough

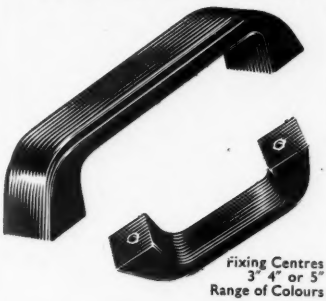
EXPERT TECHNICAL ADVICE
is always available to you

MOULDED RUBBERS

We welcome your enquiries:

THE HARBORO' RUBBER CO. LTD.
MARKET HARBOROUGH . TEL.: 2274/5

HANDLES



Fixing Centres
3" 4" or 5"
Range of Colours

Litholite
PLAS IC MOULDERS
FOR NEARLY 50 YEARS
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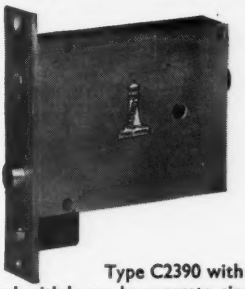
ELECTRIC LOCKS



Type C2390 with bolt shot and withdrawn by separate circuits. Supplied complete with catchplate and emergency key and suitable for doors exceeding 1½" thickness.

Sole Manufacturers and Patentees :

W. C. DAVEY & CO.
Queens House
180-182a, Tottenham Court Road, London, W.1
Telephone : MUSeum 4414, 4415 & 6388

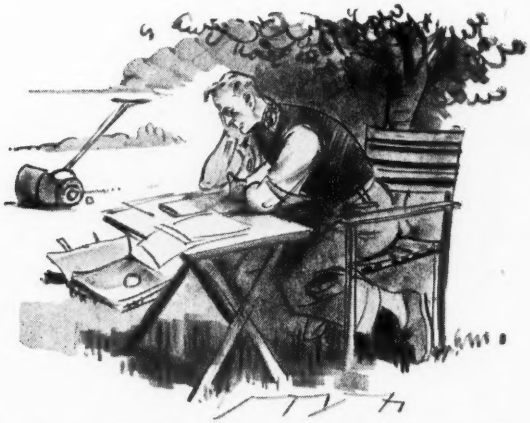
186-19

. . . for all electrical installations

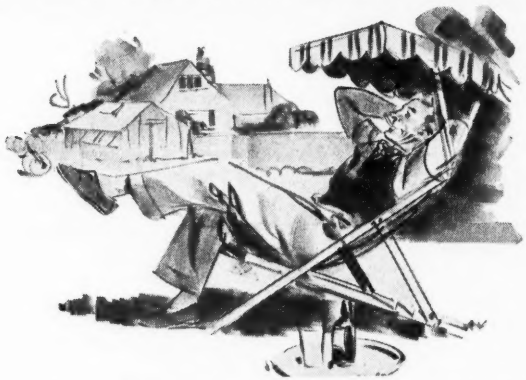
F. H. Wheeler
& Co. Ltd.

London, Manchester, Birmingham, Sheffield, Cardiff, Glasgow, Southampton, Bristol, Bournemouth

His problems never left him...



now he leaves them to Lorival

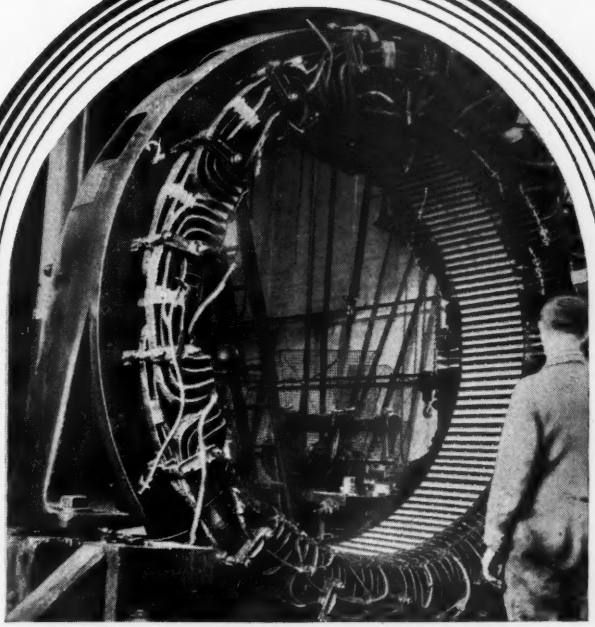


L31R

What you can leave to Lorival: the estimation, design and production of plastic mouldings, including injection mouldings, ebonite and composition materials. The extrusion of ebonite, pliable and rigid plastic tubes, rods and sections, calendered sheet in plain or embossed finishes – and any plastic problem that's bothering you!

LORIVAL PLASTICS

UNITED EBONITE & LORIVAL LTD · LITTLE LEVER · NR. BOLTON · LANCS.



Repairs. One 1875 kVA., 3300 volts, 333 r.p.m. Alternator completely rewound for National Coal Board.

COLLINS

Collins Electrical Ltd.

Head Office 115 *Clerkenwell Road London E C* 1
Central London Works
22 *St. Albans Place Upper Street Islington N* 1
West London Works
9 *&* 11 *Featherstone Road Southall*
Phone Holborn 0233-4 *Canonbury* 3227-8
or Southall 0168

ELECTRIC CONSTRUCTION BOOSTS GAS AT BIRMINGHAM

The illustration is reproduced by permission of
WEST MIDLANDS GAS BOARD
J. E. WAKEFORD, Esq.
M.B.E., M.Inst. Gas E., M.Inst.F.
Divisional Manager.

This Electric Construction motor driving a booster at the Washwood Heath plant of the West Midland Gas Board (Birmingham District) is a 460 B.H.P. fully compensated D.C. machine with a speed range of 750/1750 R.P.M. It is pressure-ventilated from separate motor-driven fans.

The control gear for this motor and the rectifier which supplies it are of E.C.C. make.

THE ELECTRIC CONSTRUCTION Co LTD
WOLVERHAMPTON
Telephone 21455 (7 lines)

IT PLUGS INTO ANY POWER POINT!

It sells because it saves!

Tricity 473A COOKER

SAVES FUEL · SAVES SPACE

DOES NOT HEAT KITCHEN · REQUIRES NO SPECIAL WIRING

Look at some of the advantages of the famous Tricity 473A Cooker, and then look at the price. It cooks a family meal with the minimum of electricity, and is in great demand by users of solid fuel cookers as an alternative cooking method during the summer.

3 types to choose from :

473A
Standard model as illustrated. Acid resisting vitreous enamel. Price **£15 7s. 6d.**

473A/T
Similar to Standard model but fitted with a thermostatic oven control. Price **£17 1s. 0d.**

473A/TSR
As for 473A/T and with an "MV" radiant grill with Simmerstat control. Price **£18 18s. 0d.**

13 amp fused plug and socket—7/6 extra

Send for details to:

TRICITY COOKERS LTD. · 109 KINGSWAY · LONDON · W.C.2

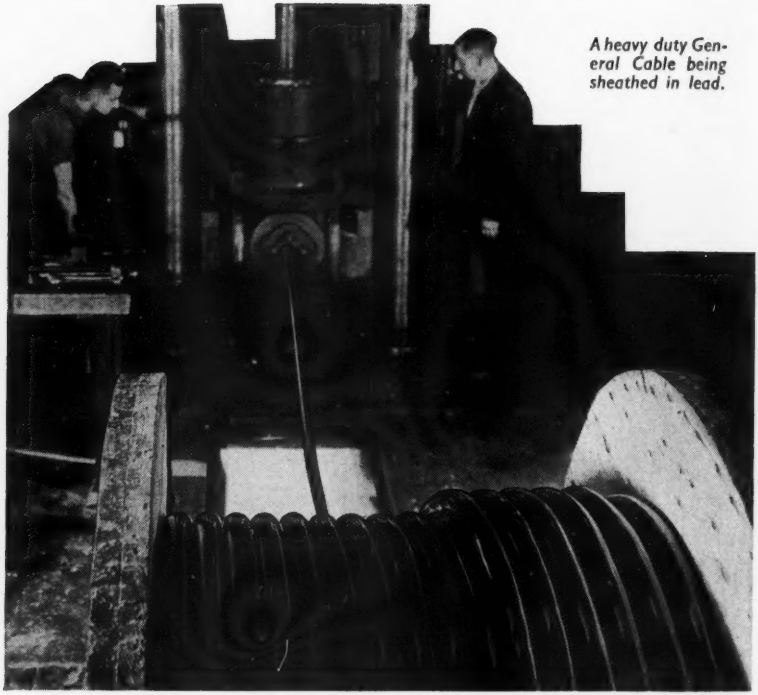
BRIDGE-BANBURY Mixer for QUALITY Mixings and OUTPUT

BRIDGE

the hallmark for Design, Service and Performance

IN RUBBER, PLASTIC, ELECTRIC CABLE-MACHINERY AND LEAD PRESSES

DAVID BRIDGE & CO. LTD. CASTLETON, ROCHDALE.
ENGINEERS TO THE RUBBER & PLASTICS INDUSTRY



A heavy duty General Cable being sheathed in lead.

READY FOR DUTY —ANYWHERE

All over the world General Cables are giving, day in, day out, satisfactory service. Extremes of heat and cold, exposure to moisture and the elements, however severe the conditions General Cables will not be found wanting. Manufactured on some of the most modern plant in the world General Cables are *tested* for quality — plus !

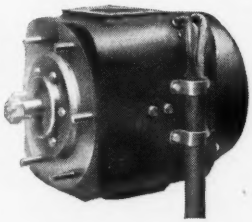
GENERAL CABLES

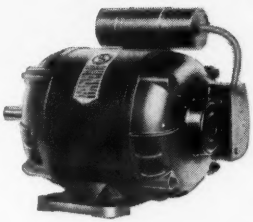
MADE AT LEATHERHEAD

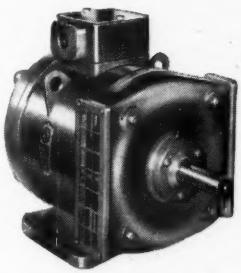
The General Cable Manufacturing Co. Ltd. Leatherhead, Surrey. 'Phone: Leatherhead 3021/4. 'Grams: "Isolde" Leatherhead. Depots at 204/206 Newhall St., Birmingham. 54a Newton St., Manchester. 55/63 Washington St., Glasgow, C.2

SEM

PRECISION BUILT ELECTRIC MOTORS







With a background of more than 35 years' experience in the manufacture of small electric motors and generators, we offer to the engineering industry the S.E.M range of single phase capacitor start motors, 3-phase standard and high torque motors, textile loom motors, and traction motors with control gear for incorporation in battery operated electric vehicles. Our Designers and representatives are available to offer expert advice on problems involving the use of electric motors and control gear for special applications. *May we send our catalogue ?*

SMALL ELECTRIC MOTORS LTD

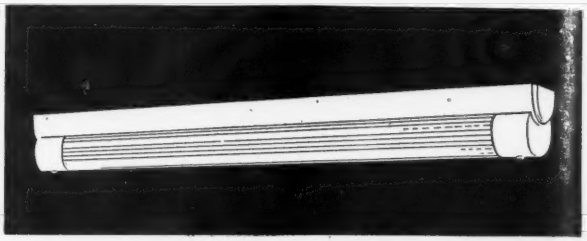
BECKENHAM · KENT

Beckenham 0066 & 1152.

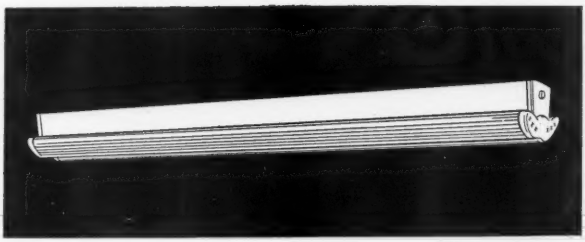
Manufacturers of Control Gear, Transformers, Switchgear, etc. Contractors to all Government Departments.

G.E.C.

NEW DECORATIVE fluorescent fittings



White stove enamelled channel with reeded "Perspex" bend and opal "Perspex" ends.



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Two decorative fittings for office or shop illumination. They use G.E.C. "brick" control gear and are arranged for 40 or 80 watt Osram lamps. Alternative twin-lamp versions of both fittings are also available. There are over 100 standard designs in the G.E.C. range of fluorescent fittings, details of which will be supplied on request. Our telephone number is TEMple Bar 8000.

THE GENERAL ELECTRIC CO. LTD., MAGNET HOUSE, KINGSWAY, LONDON, W.C.2.

CLASSIFIED ADVERTISEMENTS

ADVERTISEMENTS are accepted up to **First Post on Monday** of the week of issue, and should be addressed to Classified Advertisement Department, Dorset House, Stamford Street, London, S.E.1.

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Original testimonials should not be sent with applications for employment

OFFICIAL NOTICES, TENDERS, ETC.

ROYAL BURGH OF SELKIRK

Street Lighting: Edinburgh-Carlisle Trunk Road (A7)

TENDERS are invited for the provision, erection and installation of Mercury Discharge Street Lighting within the Burgh over a continuous length of 1,135 yards of the above trunk road, to Group A standard throughout, and comprising 31 lighting points.

Plan may be inspected at the office of the Burgh Surveyor, Municipal Buildings, Selkirk.

Copies of the conditions of contract, specification, schedule of quantities and form of tender may be obtained on application to the subscriber at the undernoted address.

Sealed tenders, accompanied by a priced schedule of quantities, and marked "Trunk Road Lighting," must be lodged with the Town Clerk, Town Clerk's Office, Municipal Buildings, Selkirk, not later than twelve noon on Monday, 14th July, 1952.

The Town Council shall not be bound to accept the lowest or any tender.

W. Y. CARMICHAEL.
Town Clerk's Office, Town Clerk.
Municipal Buildings, Selkirk.
16th June, 1952. 584

PRESCOT URBAN DISTRICT COUNCIL

Street Lighting: Trunk Road A.57

THE Urban District Council invite tenders for the proposed supply, erection and commissioning of sodium vapour discharge lighting units on the Liverpool/Warrington Trunk Road A.57 within the Urban District, for approximately 2,886 yards. The drawings and general conditions of contract may be inspected at the Council Offices, Prescot, or at the Liverpool City Lighting Department, 17, Highfield Street, Liverpool, 3, and copies of the special conditions of contract and specification and form of tender may be obtained from the former, on payment of a deposit of 2 guineas, which will be refunded on the submission of a bona fide tender.

Tenders, in a plain sealed envelope, are to be forwarded to the Clerk of the Council, Council Offices, Prescot, not later than 12 noon on Saturday, the 12th day of July, 1952. The Council do not bind themselves to accept the lowest or any tender.

F. LAMBERT.
Council Offices, Prescot. Clerk of the Council.
16th June, 1952. 643

SITUATIONS VACANT

The engagement of persons answering these advertisements must be made through the Local office of the Ministry of Labour and National Service, etc., if the applicant is a man aged 18 - 64 or a woman aged 18 - 59 inclusive, unless he or she or the employer is excepted from the provisions of The Notification of Vacancies Order, 1952.

SOUTH WESTERN ELECTRICITY BOARD

SENIOR DEMONSTRATOR/HOUSECRAFT ADVISER West Cornwall District, with headquarters at Camborne. N.J.C. Grade 2 (£440-£500).

Applicants must be qualified demonstrators, holding recognised diplomas in domestic science and possessing E.A.W. Certificate. Must be capable of giving lectures and demonstrations, and of advising consumers on use of electrical equipment.

Detailed applications to Sub-Area Manager, South Western Electricity Board, Pool, Redruth, Cornwall, within 10 days. 603

ELECTRICITY SUPPLY COMMISSION (SOUTHERN RHODESIA)

Vacancy: Test Assistant

APPLICATIONS are invited for the above vacancy which exists at the Commission's Test Department, Salisbury.

Technical Qualifications: Graduate I.E.E. or equivalent. Approximately 12 years' general experience in electrical testing is required. This period does not include apprenticeship, which should preferably have been served in the testing department of a large overseas electrical engineering works.

Specific experience required is as follows:—

(1) To be fully conversant with the testing, dry-out and inspection of all types of power and distribution transformers, including on-load tap changing units.
(2) Induction line voltage regulating equipment.
(3) Switchgear of all types.
(4) Condensers.
(5) Alternators and associated equipment.
(6) A.C. and D.C. motors, including control equipment.
(7) Checking and testing H.T. metering cubicles, switchboards and control panels manufactured and assembled at the Commission's workshops.
(8) General knowledge of instruments, meters and associated equipment. Instrument and meter secondary circuits.
(9) All test work involved in commissioning E.H.T. substation equipment, including transmission lines.
(10) The successful applicant would be required to supervise and direct staff placed under his control at any time.

Applicants should be, preferably, within the 30-35 years age group. Age limitation may, however, be waived in the event of the applicant's experience and qualifications being suited to the Commission's requirements.

Salary scale: £942 × £36 to £1,050 per annum.

The general conditions of service include a contributory pension scheme, medical aid society, holiday fund, 45 days' full-pay leave per annum, paid sick leave, child and dependant allowances where applicable. In addition to basic salaries at present a cost-of-living allowance of approximately 18% applies. The appointment will be subject to satisfactory medical examination and three months' probationary period.

Applications, giving age, educational and technical training and subsequent experience in chronological order, nationality, marital state with number and age of dependants, and enclosing copies of testimonials (which will not be returned) should be addressed to the Secretary, Electricity Supply Commission, P.O. Box 377, Salisbury, Southern Rhodesia, so as to arrive not later than the 23rd July, 1952. 648

NOTTINGHAMSHIRE COUNTY COUNCIL

County Architect's Department

APPLICATIONS are invited for two superannuable posts of ASSISTANT ELECTRICAL ENGINEER at salaries within £600× £20 to £660 p.a. or £570 × £15 to £620 p.a. according to qualifications and experience.

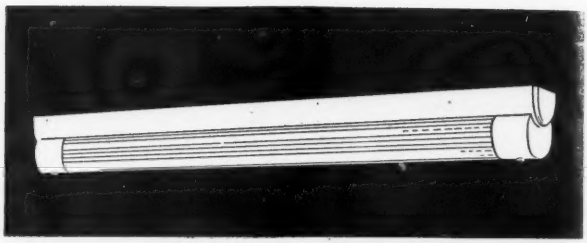
Applicants should be Associate Members of the Institution of Electrical Engineers. They must be capable draughtsmen with experience in the preparation of schemes, specifications and estimates for all classes of electrical installation work.

Application forms and further particulars are obtainable from the County Architect, County Hall, Trent Bridge, Nottingham, to whom applications should be sent by 11th July, 1952. Canvassing disqualifies.

K. TWEEDALE MEABY,
Clerk of the County Council. 616

G.E.C.

NEW DECORATIVE fluorescent fittings



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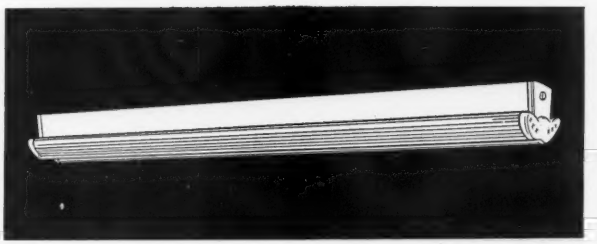

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ROYAL BURGH OF SELKIRK

Street Lighting: Edinburgh-Carlisle Trunk Road (A7)

TENDERS are invited for the provision, erection and installation of Mercury Discharge Street Lighting within the Burgh over a continuous length of 1,135 yards of the above trunk road, to Group A standard throughout, and comprising 31 lighting points.

Plan may be inspected at the office of the Burgh Surveyor, Municipal Buildings, Selkirk.

Copies of the conditions of contract, specification, schedule of quantities and form of tender may be obtained on application to the subscriber at the undernoted address.

Sealed tenders, accompanied by a priced schedule of quantities, and marked "Trunk Road Lighting," must be lodged with the Town Clerk, Town Clerk's Office, Municipal Buildings, Selkirk, not later than twelve noon on Monday, 14th July, 1952.

The Town Council shall not be bound to accept the lowest or any tender.

W. Y. CARMICHAEL,
Town Clerk.

Town Clerk's Office,
Municipal Buildings, Selkirk.
16th June, 1952. 584

PRESCOT URBAN DISTRICT COUNCIL

Street Lighting: Trunk Road A.57

THE Urban District Council invite tenders for the proposed supply, erection and commissioning of sodium vapour discharge lighting units on the Liverpool/Warrington Trunk Road A.57 within the Urban District, for approximately 2,886 yards. The drawings and general conditions of contract may be inspected at the Council Offices, Prescot, or at the Liverpool City Lighting Department, 17, Highfield Street, Liverpool, 3, and copies of the special conditions of contract and specification and form of tender may be obtained from the former, on payment of a deposit of 2 guineas, which will be refunded on the submission of a bona fide tender.

Tenders, in a plain sealed envelope, are to be forwarded to the Clerk of the Council, Council Offices, Prescot, not later than 12 noon on Saturday, the 12th day of July, 1952. The Council do not bind themselves to accept the lowest or any tender.

F. LAMBERT,
Clerk of the Council.

Council Offices, Prescot.
16th June, 1952. 643

SITUATIONS VACANT

The engagement of persons answering these advertisements must be made through the Local office of the Ministry of Labour and National Service, etc., if the applicant is a man aged 18 - 64 or a woman aged 18 - 59 inclusive, unless he or she or the employer is excepted from the provisions of The Notification of Vacancies Order, 1952.

SOUTH WESTERN ELECTRICITY BOARD

SENIOR DEMONSTRATOR/HOUSECRAFT ADVISER West Cornwall District, with headquarters at Camborne. N.J.C. Grade 2 (£440-£500).

Applicants must be qualified demonstrators, holding recognised diplomas in domestic science and possessing E.A.W. Certificate. Must be capable of giving lectures and demonstrations, and of advising consumers on use of electrical equipment.

Detailed applications to Sub-Area Manager, South Western Electricity Board, Pool, Redruth, Cornwall, within 10 days. 603

ELECTRICITY SUPPLY COMMISSION (SOUTHERN RHODESIA)

Vacancy: Test Assistant

APPLICATIONS are invited for the above vacancy which exists at the Commission's Test Department, Salisbury.

Technical Qualifications: Graduate I.E.E. or equivalent. Approximately 12 years' general experience in electrical testing is required. This period does not include apprenticeship, which should preferably have been served in the testing department of a large overseas electrical engineering works.

Specific experience required is as follows:—

(1) To be fully conversant with the testing, dry-out and inspection of all types of power and distribution transformers, including on-load tap changing units.
(2) Induction line voltage regulating equipment.
(3) Switchgear of all types.
(4) Condensers.
(5) Alternators and associated equipment.
(6) A.C. and D.C. motors, including control equipment.
(7) Checking and testing H.T. metering cubicles, switchboards and control panels manufactured and assembled at the Commission's workshops.
(8) General knowledge of instruments, meters and associated equipment. Instrument and meter secondary circuits.
(9) All test work involved in commissioning E.H.T. substation equipment, including transmission lines.
(10) The successful applicant would be required to supervise and direct staff placed under his control at any time.

Applicants should be, preferably, within the 30-35 years age group. Age limitation may, however, be waived in the event of the applicant's experience and qualifications being suited to the Commission's requirements.

Salary scale: £942 × £36 to £1,050 per annum.

The general conditions of service include a contributory pension scheme, medical aid society, holiday fund, 45 days' full-pay leave per annum, paid sick leave, child and dependant allowances where applicable. In addition to basic salaries at present a cost-of-living allowance of approximately 18% applies. The appointment will be subject to satisfactory medical examination and three months' probationary period.

Applications, giving age, educational and technical training and subsequent experience in chronological order, nationality, marital state with number and age of dependants, and enclosing copies of testimonials (which will not be returned) should be addressed to the Secretary, Electricity Supply Commission, P.O. Box 377, Salisbury, Southern Rhodesia, so as to arrive not later than the 23rd July, 1952. 648

NOTTINGHAMSHIRE COUNTY COUNCIL

County Architect's Department

APPLICATIONS are invited for two superannuable posts of ASSISTANT ELECTRICAL ENGINEER at salaries within £600× £20 to £660 p.a. or £570 × £15 to £620 p.a. according to qualifications and experience.

Applicants should be Associate Members of the Institution of Electrical Engineers. They must be capable draughtsmen with experience in the preparation of schemes, specifications and estimates for all classes of electrical installation work.

Application forms and further particulars are obtainable from the County Architect, County Hall, Trent Bridge, Nottingham, to whom applications should be sent by 11th July, 1952. Canvassing disqualifies.

K. TWEEDALE MEABY,
Clerk of the County Council. 616

CROWN AGENTS FOR THE COLONIES

ENGINEERS, ASSISTANT INSPECTING, required for service on the Engineering Inspection Staff of the Crown Agents, primarily in the United Kingdom. Basic salary scale £575 × £25 to £750 × £30 to £800. The £575 minimum is linked to entry at age 25 and is subject to increase at the rate of one increment for each year above that age up to but not exceeding 34. Pay addition to basic salary payable as follows: 10% on first £500, 5% on salary over £500. An extra duty allowance of 8% on basic annual salary plus pay addition also payable at present. Engagements will be on unestablished terms, with a prospect, after satisfactory service, of appointment to the established and pensionable staff in due course, vacancies permitting. Fully qualified officers of at least 27 years of age who have completed two years' satisfactory service are eligible under certain conditions for a special increase in salary of £75.

Opportunities. Opportunities for promotion to Inspecting Engineer (maximum basic salary £1,050) and Engineer posts in the London office with higher salaries are open to those who make this work their career.

Qualifications. Candidates, aged 25-30, should be Corporate Members of one of the major engineering institutions or have passed the qualifying examination for associate membership, or an equivalent examination. They should have served an apprenticeship or pupilage and have had subsequent experience in one of the principal branches of engineering, such as locomotives or rolling stock, motor transport, pumps, electrical work, diesel engines or structural work, etc.

Duties. To visit manufacturers' works during the course of the fabrication of plant and equipment to advise and assist manufacturers in maintaining required standards, and carry out inspection and tests on materials, components and finished units to ensure that the requirements laid down in contract specifications have been complied with, and that the equipment will function satisfactorily in service.

Conditions of Service. The selected candidates will be required to reside in one of the industrial centres in the United Kingdom, but may be liable to transfer as the exigencies of the work demand, and may be called on to make periodic visits to Continental works as well as works in this country.

Generous leave and sick leave allowances are granted. Travelling expenses and/or car mileage allowance, with appropriate subsistence allowances, are paid.

Apply at once by letter to the Crown Agents for the Colonies, 4, Millbank, London, S.W.1, quoting on letter M.29418B, stating full names in block letters, age, whether married or single, full particulars of qualifications, experience, knowledge of French, German or Italian. 594

NORTH WESTERN ELECTRICITY BOARD

Junior Engineers

JUNIOR ENGINEER is required in the Design and Planning Section, Town Hall, Manchester. Applicants should have received a technical education to H.N.C. level and have served an engineering apprenticeship or received equivalent training. The duties involve the preparation of schemes and estimates for extensions to a large city network and associated protective gear and metering problems. Drawing office experience an additional qualification.

JUNIOR ENGINEERS (Testing Assistants) are required in the No. 1 Sub-Area, Manchester. Applicants should have had experience of testing meters, instruments or protective equipment, and should hold the O.N.C. in Electrical Engineering.

Salary scale: £375/£527 per annum, Grades M.21/17. N.J.B. conditions.

Applications for the above posts to the Sub-Area Secretary, No. 1 Sub-Area, North Western Electricity Board, Town Hall, Manchester, 2, P.O. Box 493, by 5th July, 1952.

District Commercial Engineer, Macclesfield District

Duties will include organisation and control of all commercial staff and functions in the District; supply of information and advice to consumers on electricity utilisation, tariffs, terms, apparatus and all matters concerning electricity services; organisation and supervision of maintenance work on consumers' premises, including emergency service, routine testing and repair of domestic appliances, including control of workshops; control of service centres and exhibitions; supervision of consumer records.

Salary scale: £833/£868 per annum, Grade E.3, N.J.B. conditions.

Application forms can be obtained from the Sub-Area Manager, No. 7 Sub-Area, North Western Electricity Board, Chapel Street, Hazel Grove, Cheshire, and must be returned to him by 12th July, 1952. 617

YORKSHIRE ELECTRICITY BOARD

APPLICATIONS are invited for the following appointments:—

No. 3 (Sheffield) Sub-Area

ASSISTANT INSTALLATION ENGINEER (Vacancy No. 80/52). Applicants should possess a sound technical training, have served a full apprenticeship with a recognised firm of electrical contractors, and subsequently have had a wide experience of all classes of electrical contracting work covering installations for lighting, heating and power.

Details should be given of experience in the following matters: Preparation of specifications, estimates and tenders for all classes of installation work. Application of I.E.E. Wiring Regulations and other relevant regulations covering electrical contracting work. Maintenance work, including knowledge of rewinding and repair of electrical machinery. Layout and supervision of installations on site. Use of modern methods of estimating. Control of staff and workpeople.

Salary: N.J.B. Class L, Grade 10, £741/£769 p.a.

GENERAL ASSISTANT DISTRICT ENGINEER, ROTHERHAM DISTRICT (Vacancy No. 80/52). Applicants should have a good general and technical education with practical training in an engineering workshop or in the electricity supply industry. Experience in the construction, operation and maintenance of H.V. and L.V. underground and overhead distribution is necessary.

Candidates should be prepared to reside in the District.

Salary: N.J.B. Class G, Grade 11, £553/£576 p.a.

Applications, stating the above vacancy number and giving full details of age, qualifications and experience, should be forwarded to the Manager, No. 3 (Sheffield) Sub-Area, Yorkshire Electricity Board, Commercial Street, Sheffield, not later than 10th July, 1952.

No. 1 (Bradford) Sub-Area

HOUSECRAFT ADVISER (FEMALE) (Vacancy No. 81/52). Applicants should be qualified demonstrators holding recognised diplomas in domestic science and possessing the E.A.W. Certificate. They must have had considerable experience in the organisation of a demonstration and lecture service, control of staff, and be capable of establishing relations with education authorities, institutions, industrial and commercial catering establishments, and advising them on the use of electrical equipment.

Salary: N.J.C. Grade 3, £500/£20/£560 per annum.

Applications, stating the above vacancy number, and giving full details of age, qualifications and experience, should be forwarded to the Manager, No. 1 (Bradford) Sub-Area, Yorkshire Electricity Board, 45-53, Sunbridge Road, Bradford, not later than 10th July, 1952. 618

EASTERN ELECTRICITY BOARD

Appointment of Senior Legal Assistant (26/52 R)

APPLICATIONS are invited from Solicitors for the appointment of a SENIOR LEGAL ASSISTANT for general legal work in the department of the Secretary and Solicitor to the Board.

The salary will be fixed within the range £1,125 p.a. to £1,300 p.a., and future salary and conditions of service will be in accordance with agreements made from time to time by the appropriate negotiating bodies.

The successful candidate will be required to contribute to a superannuation scheme and may be required to undergo a medical examination.

Applications, to arrive by 10th July, 1952, should be made by letter giving full particulars of qualifications and experience to the Secretary, Eastern Electricity Board, Wherstead, Ipswich, Suffolk.

18th June, 1952. 600

POWER PLANT SHIFT CHARGE ENGINEER

THE STEEL COMPANY OF WALES LIMITED invite applications for the above position. Applicants should have served a recognised apprenticeship with a major engineering company and have a sound general and technical education.

Experience in the following is desirable:—

(a) As Shift Charge Engineer.
(b) High-pressure boiler and turbine operation.
(c) Operational control of an interconnected H.T. industrial network.
(d) Other works auxiliary services.

Salary according to age and experience. The post will be permanent and pensionable on satisfactory service.

Applications in own handwriting should be addressed to:

The Personnel Superintendent
THE STEEL COMPANY OF WALES LIMITED
Box No. 3, Port Talbot 516

BRITISH ELECTRICITY AUTHORITY

Southern Division

APPLICATIONS are invited for the following positions:

S/13.319:
(a) SENIOR DRAUGHTSMAN (Mechanical).
(b) DRAUGHTSMAN (Mechanical).

Applicants should have had experience of work concerning turbines and auxiliaries, boilers and auxiliaries, coal and ash handling plant and pipework.

Salary: (a) N.J.B. Schedule D, Grade 5, £547-£651.
(b) N.J.B. Schedule D, Grade 6, £413-£547.

S/13.326: MECHANICAL MAINTENANCE ENGINEER, Oxford Generating Station. Applicants should have had experience in the maintenance of generating station boiler plant, be capable of taking control of the maintenance staff and supervising turbine and boiler overhauls.

Candidates should have had a sound mechanical training and preference will be given to applicants holding qualifications leading to membership of a recognised professional institution.

Salary: N.J.B. Schedule A, Class D, Grade 6, £645-£668.

Application forms for all the above posts are obtainable from P. D. A. Oliver, Esq., Divisional Secretary, British Electricity House, High Street, Portsmouth, and must be returned not later than 9th July, 1952. 688

BRITISH ELECTRICITY AUTHORITY

London Division

APPLICATIONS are invited for the following superannuable posts. Salaries, including London allowance, and conditions of service in accordance with N.J.B. Schedule A.

ASSISTANT ENGINEER (ELECTRICAL TESTING), BATTERSEA GENERATING STATION. The engineer appointed will be required to act as an assistant to the engineer engaged on testing of all internal electrical equipment at Battersea, including testing of protective gear on works auxiliaries, fault location, etc. He should have received a sound practical training in electrical engineering and have obtained some recognized technical qualification. Salary, Class L, Grade 15 = £561 15s. p.a.

ASSISTANT ENGINEER (STATISTICS), DEPTFORD EAST GENERATING STATION. Qualifications: Good general and technical education, with preferably National Certificate in Mechanical or Electrical Engineering or equivalent. Able to compile and present statistical data relating to operation station efficiency. Salary, Class H, Grade 14 = £504 p.a.

Application, stating age, qualifications and experience, to Divisional Secretary, B.E.A., London Division, Ergon House, Horseferry Road, S.W.1, within 14 days of this advertisement. 644

HARLOW DEVELOPMENT CORPORATION

Technical Assistant (Electrical, Heating & Ventilating)

APPLICATIONS are invited for the above appointment in Grade IV (a), salary £600 × £25 to £700 per annum, in the Architect Planner's Department (Frederick Gibberd, F.R.I.B.A., M.T.P.I.), to work under the direction of the Executive Architect (V. Hamnett, B.Sc., A.R.I.B.A., A.M.P.T.I., A.R.I.C.S.)

Applicants should possess appropriate technical qualifications and be experienced in preparation of electrical specifications and supervision of works and have good knowledge of heating and ventilation of factories and multiple dwellings.

The appointment will be in accordance with the Corporation's conditions of service, which are similar to those of the professional and technical grades of local authorities' staffs, and will in particular involve a contribution to an approved superannuation fund.

Housing accommodation may be made available in due course to the successful applicant.

Applications, giving full details, together with the names of two referees, should be addressed to the undersigned to reach him not later than 11th July, 1952.

W. ERIC ADAMS,
General Manager.

Terlings, Gilston,
Harlow, Essex. 647

ELECTRICAL DRAUGHTSMAN WANTED

REQUIRED, diagrams and general layouts, also cable runs similar to power station work. State age, salary required according to experience, to—Box 491.

ROYAL AIRCRAFT ESTABLISHMENT TECHNICAL COLLEGE, FARNBOROUGH, HAMPSHIRE

APPLICATIONS are invited for appointment as DEMONSTRATOR IN ELECTRICAL ENGINEERING AND PHYSICS to assist in the organisation and control of work in laboratories up to final engineering degree standard under the supervision of the lecturing staff.

Candidates should possess an electrical engineering degree or equivalent qualification, and preferably should have had some experience in industry. The selected candidate may be offered facilities to undertake research work or further study.

The post will be graded as Assistant "A" under the Burnham Scale (£375 × £18 to £630 plus allowances for degree and training), and the successful candidate will start at a point on the scale appropriate to previous experience. The usual conditions for teachers in technical colleges will apply and salary will be subject to the usual superannuation deductions. Duties to begin as soon as possible.

Further particulars relating to the post are obtainable from the Principal, R.A.E. Technical College, Farnborough, Hants, to whom applications must be sent within fourteen days of the date of this advertisement. 601

ELECTRICAL ENGINEERS

THE STEEL COMPANY OF WALES LIMITED (Steel Division) is about to form an Electrical Engineering Development Department, to handle large extensions, and has the following vacancies. All applicants must possess an Electrical Engineering Degree, or equivalent, and must have had considerable experience in heavy industry (preferably in iron and steel works).

1. DEVELOPMENT ENGINEER to take full charge of the department.
2. CO-ORDINATING ENGINEER to supervise commercial matters, office records, etc.
3. MACHINES AND CONTROL GEAR ENGINEER: Applicants must have had design experience with a leading manufacturer.
4. COMMUNICATIONS & ELECTRONICS ENGINEER.
5. CHIEF SITE ENGINEER for supervision and progressing of contracts and commissioning of plant.
6. FOUR ASSISTANT SITE ENGINEERS.
7. CHIEF DRAUGHTSMAN.

Applications should be in own handwriting addressed:

The Personnel Superintendent
THE STEEL COMPANY OF WALES LIMITED
Box No. 3, Port Talbot 359

SOUTHERN ELECTRICITY BOARD

Senior Internal Audit Assistant

CHIEF Accountant's Department at Southern Electricity House, Maidenhead. Salary, N.J.C. Grade 7 (£755/£845 per annum). N.J.C. conditions of service.

Applicants should have sound accounting and auditing experience. The possession of a recognised accountancy qualification and knowledge of accounting methods in the electricity supply industry will be an advantage. The successful applicant will be required to undertake responsibility for internal audit work in various parts of the Board's area and may be required to be absent from home five days a week during most of the year.

The successful candidate for the above appointment will be required to contribute to the B.E.A. and Area Boards Superannuation Scheme, if eligible.

Applications on forms obtainable from the Secretary, Southern Electricity House, Littlewick Green, Maidenhead, and returned to him not later than 18th July, 1952.

F. W. KEMPTON, Secretary.

27th June, 1952. 599

POWER STATION SHIFT CONTROL ENGINEERS

APPLICATIONS are invited for the above positions at the Margam Works of the Steel Company of Wales Limited. Applicants must produce evidence of advanced technical education and have experience in the control of an inter-connected H.T. network. Some experience in H.P. industrial boiler and turbine operation would be an advantage.

Salary, which is pensionable, according to age and experience.

Applications should be in own handwriting addressed:

The Personnel Superintendent
THE STEEL COMPANY OF WALES LIMITED
Box No. 3, Port Talbot 515

Second Advertisement

OLDHAM EDUCATION COMMITTEE

Municipal Technical College

APPLICATIONS are invited for the following full-time posts:—

(a) LECTURER IN THE MECHANICAL ENGINEERING DEPARTMENT.
(b) LECTURER IN THE ELECTRICAL ENGINEERING DEPARTMENT.
(c) ASSISTANTS (TWO POSTS) (GRADE B) IN THE ELECTRICAL ENGINEERING DEPARTMENT.

Graduate qualifications essential, together with good industrial and/or teaching experience. Burnham Report salaries, i.e., Lecturer, £900 × £25 to £1,000 per annum; Grade B Assistant, £450 × £25 to £750, plus allowances for degree, training and previous experience. Further particulars and application forms (returnable within two weeks of the appearance of this advertisement) obtainable from the Director of Education, Education Offices, Union Street West, Oldham, Lancs. 649

NORWICH EDUCATION COMMITTEE

The Norwich City College and Art School, Ipswich Road, Norwich

Principal: Frank Briers, D.Phil.(Oxon)

WANTED, LECTURER IN ELECTRICAL ENGINEERING, for 1st September, 1952. Candidates should possess a good University Degree in Electrical Engineering and should have had teaching and industrial experience. It is essential that candidates should be qualified to teach Electrical Machines to B.Sc. (Engineering), Part II, and Higher National Certificate students.

Salary in accordance with Lecturer Grade, Burnham Technical Scale (£900 per annum rising by annual increments of £25 to £1,000).

Application forms, which may be obtained from the Director of Education, City Hall, Norwich, on receipt of a stamped addressed envelope, should be returned to the Principal as soon as possible. 637

BRITISH ELECTRICITY AUTHORITY

SECOND ASSISTANT ENGINEER (Hydro) required to initiate and co-ordinate technical and economic investigations into schemes for hydro-electric generation and similar works and co-ordinate proposals for their general design and layout. Candidates should have an engineering degree or equivalent qualification, and experience in the development and economic assessment of hydro-electric schemes. Salary N.J.B. Grade 3, £814-£1,184, including London allowance. Pension scheme.

Applications, which will be acknowledged, should be made on forms obtainable from D. Moffat, Director of Establishments, British Electricity House, Great Portland Street, London, W.1, to be returned by 14th July, 1952. Quote reference AE/264. 636

BRITISH ELECTRICITY AUTHORITY

South Western Division

JUNIOR ENGINEER (Control) required at Hayle Generating Station. Superannuation scheme. Salary in accordance with Clause 35 of the N.J.B. Agreement, Class F, commencing at Grade 15, £375 p.a.

Applicants should possess O.N.C. in Electrical or Mechanical Engineering or equivalent. Previous generating station experience considered an advantage.

Apply by 5th July, 1952, stating age, qualifications, experience, present appointment and salary, to R. C. Barrett, Divisional Secretary, 26, Oakfield Rd., Bristol, 8. 18th June, 1952. 605

SOUTH EASTERN ELECTRICITY BOARD

ASSISTANT ENGINEER, Thanet District. Salary, £567-£579 p.a. under N.J.B. Schedule, Class E, Grade 9. Superannuable. Applicants should have experience in operation and maintenance of high and low voltages, cables, switchgear, transformers, overhead lines, substations, etc. Appropriate technical qualification an advantage.

Applications, giving 2 referees, must reach H. J. C. Carte, M.B.E., A.I.E.E., Thanet Manager SEEBoard, St. Peter's, Broadstairs, Kent, through the local Employment Exchange, by 9th July, 1952.

A. L. BURNELL.

June, 1952. 646

DRAUGHTSMEN AND TRACERS REQUIRED

EWBANK & PARTNERS Ltd. have vacancies for:—

ELECTRICAL ENGINEERING DRAUGHTSMEN experienced in power station and substation distribution systems.

MECHANICAL ENGINEERING DRAUGHTSMEN experienced in power station design and layout, pipework layout, circulating water systems or coal and ash handling plants.

TRACERS (Female) experienced in power station and general engineering work.

The positions are permanent and are pensionable. Free lunches are provided and a five-day week is in operation. Applicants should write in first instance, stating age, details of experience and salary required, to the Secretary, Ewbank & Partners Ltd., Engineering Consultants, 10/11, Grosvenor Place, London, S.W.1. 472

SOUTH WALES ELECTRICITY BOARD

REQUIRED an ARCHITECTURAL DRAUGHTSMAN in the Civil Engineering Department, Head Office, St. Mellons, Cardiff.

Applicants will be required to undertake the layout and preparation of working drawings for showrooms, offices and substations, including measuring up and alterations to existing buildings.

Salary in accordance with N.J.B. Schedule D, Grade 6 £413/£547).

Applications, stating age, present position and salary, qualifications and experience, and giving three referees, to be addressed to the Manager, Employment Exchange, Cardiff, so as to reach him by 8th July, 1952.

D. G. DODDS,
Secretary.

St. Mellons,
Cardiff. 645

COLLEGE OF TECHNOLOGY, BIRMINGHAM

APPLICATIONS are invited for the post of COLLEGE WORKS SUPERINTENDENT, who will be responsible to the Principal for a range of duties covering maintenance and repair of fabric, equipment and furniture; installation of equipment, supervision and control of staff, etc. Candidates should have had experience appropriate to these duties.

The salary attached to the post is £645 by three annual increments to £710 per annum. Forms of application and further particulars, including details of duties, may be obtained from the Registrar, College of Technology, Suffolk Street, Birmingham, 1.

C. McCAW, Clerk to the Governing Body. 602

BRITISH ELECTRICITY AUTHORITY

Midlands Division

JUNIOR ENGINEER required in the Technical Department, Metering Section. N.J.B. service conditions, superannuable appointment, salary within the range of Schedule C, Grade 9, £375/£552 per annum.

Duties consist mainly of the calibration of meters and instruments in the electrical laboratory, and previous experience on metering is essential.

Forms of application available from the Establishments Officer, 53, Wake Green Road, Moseley, Birmingham, 13, to be returned by 12th July, 1952.

F. W. LAWTON,
Divisional Controller. 604

A JUNIOR engineer is required by an engineering laboratory now being set up in Godalming to assist in development work on magnetic amplifiers and similar airborne electrical equipment. Previous experience is not essential. An engineering degree or Higher National Certificate would be a preferred qualification, but a young man studying for these examinations would be considered. —Box 595.

A SENIOR executive appointment is offered by Bertram Thomas (Engineers) Ltd., Manchester, who are engaged primarily on the manufacture of heavy duty D.C. switchgear and High-Speed Circuit Breakers. The applicant should possess first-class scientific and commercial qualifications, sound practical experience, originality and initiative. He should also have had good experience in the financial side of the business, including the preparation and submission of tenders; knowledge of costs of labour and material, and should be conversant with current selling prices obtainable. He would have unlimited opportunity for developing his abilities at a salary rising without limit according to his performance. Write in first instance, giving fullest particulars, to—Box 62.

A well-known firm of aircraft instrument manufacturers requires a designer-draughtsman to complete a small development section. He will be required, with assistance, to produce complete drawings at all stages from initial design to production of a new type of equipment. Experience in light engineering work is necessary, but electrical experience is not essential. Guildford area. Apply, giving particulars of qualifications and experience, to—Box 619.

AN assistant engineer is required by an engineering laboratory in Godalming for theoretical and experimental work on magnetic amplifiers and electrical instruments. Applicants should possess a degree in physics or electrical engineering or Higher National Certificate in electrical engineering. Previous experience in this type of work would be an advantage. Write, giving full details of qualifications and experience, to—Box 620.

AN interesting vacancy occurs in the development department of a leading firm of electric cooker manufacturers whose works are situated about 30 miles from London. Applicants should hold a degree in physics or engineering and should preferably be under 30 years of age. The work will comprise experimental investigation of a wide range of problems connected with electric cooking and heating equipment. A sound knowledge of fundamental principles is of greater importance than practical experience in this field, but some industrial experience will be regarded as an advantage. Reply with full details of age, educational qualifications and practical training to—Box 493.

ARMATURE winder required. Top rate paid for experienced man.—Worboys, Barking (RIP. 1173). 8451

ARMATURE winder wanted for repair shop. Apply—Minta, Hartley Road, Luton. 8434

ASSISTANT electrical engineer required, London area, age 20-24, applicant must have served works apprenticeship, H.N.C. standard preferred, estimating and commercial experience of motors and/or switchgear and allied equipment.—Box 650.

ASSISTANT engineer required by important manufacturing company in North East London, for commercial and technical work in transformer sales and contracts department, with special reference to on-load tap-changing equipment. Degree standard or equivalent. Write stating age, education, experience and salary required to—Box 651.

ASSISTANT engineers required immediately, preferably experienced in the survey and construction of overhead transmission lines, mainly wood pole type. Give full details of age, education, experience and salary expected to—Box 870, Keith & Co., Advertising Agents, Edinburgh. 621

BRITISH ENGINE BOILER AND ELECTRICAL INSURANCE Co. Ltd., 24, Fennel St., Manchester, 4. The company requires additional electrical plant inspectors. Permanent positions carrying progressive salary scale £520 to £750 and non-contributory pension. Candidates, age 26 to 30 years, with apprenticeship in the manufacture of electrical machinery, and preferably with subsequent experience of repairs and industrial use of electrical machinery, and who have gained the Higher National Certificate in Electrical Engineering or are Graduates of the Institution of Electrical Engineers, are invited to apply in own handwriting, stating age, qualifications and experience. 585

DRAUGHTSMAN (electrical) required by the Midland Tar Distillers Ltd., Four Ashes Works, Nr. Wolverhampton, for their new works in the course of construction. Good conditions and interesting work. Apply through the Ministry of Labour. 622

DRAUGHTSMAN, experienced in telephone and/or electronic engineering, required in August. Apply in writing, stating age, experience and salary required, to—Autophone Ltd., 539/547, Wandsworth Road, London, S.W.8. 8457

DRAUGHTSMAN-designer, electro-mechanical apparatus. Experience of circuit work an advantage. Apply (quoting ref. STK)—Personnel Dept., General Electric Co. Ltd., Union Works, East Lane, Wembley, Middlesex. 361

DRAUGHTSMEN (electrical) with a knowledge of radar and communication circuits, or of aircraft electrical installations, wiring systems and electrical instruments, are required by the Ministry of Supply at an establishment in Chessington, Surrey. Applicants should possess the Ordinary National Certificate or equivalent technical qualification and have had at least three years' workshop experience. Starting rate in the range £363 (at age 21) to £512 p.a. according to age, rising to £612 p.a. Applications should be sent to the Employment Exchange, Water Lane, Kingston-on-Thames, quoting Order No. 4198. 586

DRAUGHTSMEN required. One with knowledge of design of small high torque induction motors, also one for design of electrical accessories. Birmingham district.—Box 447.

EFFICIENCY engineer. Large modern power station in London district invites applications from men not more than 45 years of age. Candidates must have had good power station experience, a knowledge of principles of combustion, heat balances, economics of plant operation, and possess at least Higher National qualifications. Non-contributory pension scheme. Commencing salary £950 approximately. Very good prospects for a suitable man. Reply to Box 475, quoting reference T/EE.

ELECTRIC lamp manufacturers require energetic young man with knowledge of automatic mounting mill. Progressive situation for ambitious young man.—Box 8444.

ELECTRIC lamps. Foreman wanted with wide experience in manufacture of all types of lamps with particular reference to stem making. Must be a fully experienced practical man able to train setters and operatives on automatic and semi-automatic machines. Good conditions and prospects. Apply with full details, including domestic position, to—Box 497.

ELECT. draughtsman reqd. Mid. East. State age, exp., etc.—Box 654.

ELECTRICAL draughtsman required by the Midland Tar Distillers Ltd., Four Ashes Works, near Wolverhampton, for their new works in the course of construction. Good conditions and interesting work. Apply through Ministry of Labour. 385

ELECTRICAL draughtsman required with some estimating experience on construction and factory maintenance. Apply Employment Manager, Vickers-Armstrongs Limited (Aircraft Section), Weybridge, Surrey. Applications, with certain exceptions, are subject to the approval of the Ministry of Labour and National Service. 652

ELECTRICAL engineer-draughtsman required with experience in the design and installation of power and lighting schemes, distribution and control diagrams, etc. Excellent prospects for suitable men offered by Tees-side firm. Apply, giving full particulars, to—Employment Exchange, Stockton-on-Tees. 596

ELECTRICAL engineer or physicist, with Higher National Certificate or equivalent, is required for the design of small quantities of special transformers for experimental apparatus. This appointment is at Stanmore. Apply to the Staff Manager (Ref. GBLC/S/216), Research Laboratories of the General Electric Co. Ltd., Wembley, Middlesex, stating age, qualifications and experience. 498

ELECTRICAL engineer required for electrical department of works in the North-East. Should have a sound practical training, drawing office experience, a knowledge of motor control gear resistance calculations, and preferably some experience of electrical heating for industrial applications. Apply, giving full details of experience, technical qualifications, age, whether married or single, and salary required, to—Box 426.

ELECTRICIAN, technically trained, with knowledge of drawings required for getting out schemes, routing cables, etc. Reply, stating age, experience and salary required, to—Box 653.

ELECTRICIAN wanted by London contractor; must have thorough knowledge of trade. Prospects. Write, stating age and experience, to—Box 606.

ELECTRONIC fitter/wiremen (3) required for high-grade rack and panel equipment. Men with audio, transmitter or test gear wiring experience, able to fabricate small parts, work to circuit drawings, and undertake prototypes can be nominated for registered vacancies after interview. Five-day week, overtime option and pension scheme. Interview at company's London works, W.12, or can be arranged at company's nearest provisional depot. Write stating age and details of industrial and services experience, also technical training.—Box 638.

ENGLISH ELECTRIC Company Limited have vacancies for junior production engineers at their Stafford works. These positions call for initiative and ability, with the Ordinary National Certificate in mechanical/production engineering as minimum qualification. The work is concerned with the production, development, methods, processes and works layout entailed in the manufacture of high-voltage switchgear to batch and customers' orders. Experience of switchgear is not essential. Write, giving full details and quoting ref. "English Electric 9038," to —Westminster Employment Exchange, Chadwick Street, London, S.W.1. 474

FOREMAN to take charge of electrical contracting department. Must be capable of planning and estimating for industrial and domestic work, including maintenance. —Simpson Brothers (of Hapton) Ltd., Hapton, Near Burnley, Lancs. 520

FOREMAN/manager, to organise small motor winding and repair shop, London district. Preference will be given to applicants able to influence new business. Salary plus share of profits.—Box 553.

GRADUATE electrical engineer for electrical laboratory work associated with cable development. Previous experience not essential. Salary according to experience and qualifications. Applications, in writing, to—The Staff Officer, British Insulated Callender's Cables Ltd., Prescot, Lancs. 639

JOHNSON & PHILLIPS Ltd.: Switchgear works in Johannesburg, South Africa. Senior switchgear design and development draughtsman required for power station and control gear ranging from medium to high voltage (11 kV). Only experienced men, not above 35 years of age, need apply. Reply, stating age, salary and experience, to—Employment and Welfare Manager, Johnson & Phillips Ltd., Charlton, London, S.E.7. 500

JOINTERS and jointers' mates required for telephone cable contracts. Good wages, out allowance and pension scheme. Apply in writing to—Telecommunications Dept., Pirelli-General Cable Works Ltd., Eastleigh, Near Southampton. 248

JOSEPH LUCAS Ltd. require a young senior engineer for research and development of non-linear mechanical and electrical vibrating systems. An honours degree in engineering science is essential and it is desirable that applicants should have had an engineering apprenticeship and experience in design for large quantity production. Reply, stating qualifications, experience and age, to—Personnel Manager, Joseph Lucas Ltd., Great King St., Birmingham. 624

JOSEPH LUCAS Ltd. require a young senior engineer for the design and development of light electrical equipment with particular reference to small motors and gear boxes. Applicants should have an engineering degree, experience in design for large quantity production, and a knowledge of production methods and techniques. Applicants should be energetic and should have had an engineering apprenticeship. The position is a permanent one and offers excellent prospects for advancement. Reply, stating qualifications, experience and age, to—Personnel Manager, Joseph Lucas Ltd., Gt. King Street, Birmingham. 623

JUNIOR development engineer, aged 24 to 30, required for research and development work on domestic electrical equipment manufactured by a large engineering company with laboratories in the West London area. Applicants should have Higher National Certificate or Inter. B.Sc. Knowledge of radio an advantage. Salary at 25 years, £10 15s.; 5-day week; canteen facilities, etc. Write, giving details of qualifications and previous experience to—Box 607.

JUNIOR draughtsman, military service completed, required by firm of fractional horsepower motor manufacturers, S.W. London. Progressive position for chosen applicant.—Box 655.

LABORATORY assistant, aged 20/25, is required for work on electrical insulation problems by a company in East London. General background should be electrical with a basic knowledge of physics and chemistry; special training will be given. Salary in the range £300-£450, depending on qualifications and experience. Please reply to—Box 656.

LEADING and senior draughtsmen required for transformer work of the largest class. Apply by letter, quoting "Transformer" and giving full details of age, experience and salary required, to—Staff Manager, The General Electric Co. Ltd., Witton, Birmingham. 625

MAN required for estimating dept., cable manufacturers, East London. Permanent progressive post for applicant with some experience.—Box 8456.

MANUFACTURERS of lighting equipment and other metal products require keen young manager to take charge of London office and stores. Executive ability, some experience electrical wholesale trade essential. Full details, age, qualifications, etc.—Sales Director, R. & A. G. Crossland Ltd., Neptune House, Water Lane, London, E.C.3. 657

POSTGRADUATE apprenticeships. Applications are invited from men with a university degree in engineering or equivalent qualification for two-year course of training with electrical engineering company (Manchester) manufacturing high and medium voltage switchgear. Suitable posts will be available at the completion of training. Special consideration will be given to those who have completed their period of National Service. Give full particulars to—Box 501.

POSTGRADUATE apprenticeships in heavy electrical engineering. The General Electric Co. Ltd., Witton, invites applications for the above training from men possessing a degree or equivalent in electrical engineering, who have been or shortly will be released from military service. A few vacancies available in special cases for direct employment. Write for further details to—The Education and Training Officer, The General Electric Co. Ltd., Witton, Birmingham, 6. 626

PIRELLI-GENERAL CABLE WORKS Ltd. have sales department staff vacancies for general correspondence and preparation of mains cable tenders. Apply in writing to—Sales Manager, Eastleigh Works, Nr. Southampton. 529

PLASTICS technologist required by large cable manufacturing concern in the North-West. Good opportunities for man with expert knowledge of plastics and with the imagination and drive required for progressive developments in the cable field. Remuneration will be according to qualifications and experience. Applications to—Box 608.

PRODUCTION engineer/works manager (S. London) reqd. with wide practical experience of mass production methods of manufacture, processes and assembly of small electrical components, including works planning and progress. This vacancy offers an unusual opportunity and salary to a keen engineer having good organising ability, initiative and drive. Present staff 100. This post is perm. and progressive and offers ample scope for future advancement to the right man. Write in confidence, giving full details of past experience, to—Box 34, c/o Geo. Murray (Advt.) Ltd., 184 Strand, London W.C.2. 627

QUALIFIED electrical engineer, A.M.I.E.E. or exempting examination, aged 27/38 years, possessing a comprehensive knowledge of electrical installation work in all types of buildings, including factories, hospitals, schools, cinemas, etc., and fully conversant with the recognised wiring systems and all relevant regulations governing this type of work. Must possess knowledge of building construction and be capable of reading architects' and engineers' drawings. Able to prepare complete electrical specifications and illumination schemes. Successful applicants will be required to work in Glasgow or Edinburgh. Candidates should be of Scottish birth or extraction. 5-day week. Pension fund. Reply to Box 587, giving details of age, qualifications, experience and salary required.

SALES engineers. Additional representation required owing to the further development of Tricity Cookers Ltd. Remuneration by salary, commission and expenses. Applications (in confidence) in writing to 109, Kingsway, London, W.C.2, should give full details of experience, age, and state whether car owner. 531

SALES engineers. Progressive opening for junior and senior men, preferably with some electrical experience.—Higgs Motors, 109, Kingsway, London, W.C.2. 588

SALES engineers required by industrial photo-electric equipment manufacturers. Good connection with industrial process-heating plant manufacturers and works engineers of large manufacturing concerns desirable. Ability to read and prepare control circuitry and to interpret industrial control problems photo-electrically necessary. Area covered, London and Home Counties. Car owners necessary. Salary and expenses commensurate with experience.—Box 597.

SALES manager. A large company manufacturing heavy electrical equipment wish to appoint a manager for their home sales department at their factory and a manager for the London sales office. Candidates must be corporate members of I.E.E. with sound technical training and considerable sales experience. Age range 30-45 years. Salaries £1,000-£1,500, dependent on qualifications and experience. Full details of qualifications, etc., to—Box 589.

SALES representative with knowledge of E.L.M.A. lamps, lighting equipment, cables, etc., required for London area by well-known electrical manufacturers. Write stating age, experience and salary required, to—Box 641.

SENIOR draughtsman required for production drawings of small electrical and mechanical clockwork mechanisms. Must be familiar with small tolerances and up-to-date methods of mass production. Modern factory in North-West London area. Five-day week. Canteen. Please quote reference MA2/110.—Box 628.

STATOR winder, repair work, improver considered, good prospects.—Simmons Electric, Simpsons Rd., Bromley, Kent (RAV. 5906). 521

SUPERVISING electrical engineer required to take over resident managership of branch at Camberley. Apply, stating age, experience, qualifications and salary required, to—Arthur Cozens Ltd., Electrical Contractors, Sunninghill, Ascot. 583

SUPERVISING engineer required by firm of electrical contractors in South Wales area; experience from enquiry stage to final account. Living accommodation available. State experience, salary required, references. —Box 8447.

TELEPHONE junior engineer or mechanic, single, wanted for Brazil. Must have thorough knowledge automatic working and underground and overhead construction and maintenance. Write, giving full particulars of experience, age, etc., to—Box 696, c/o Walter Judd Ltd., 47, Gresham Street, London, E.C.2. 590

SALES office engineer required in Selenium Metal Rectifier Division. Applicants should possess sound technical qualifications together with commercial or contracts/engineering experience. Write giving age, qualifications and details of experience, to—Personnel Manager, Standard Telephones and Cables Limited, Warwick Road, Boreham Wood, Herts. 687

TECHNICAL writers required, either sex, fully or partly experienced and with some electrical background for writing of bulletins, specifications, notes, etc. Applicants must be able to express themselves clearly and concisely and be capable of writing bulletins from existing technical data and the re-writing and revising of existing publications. A variety of work exists covering material specifications, circuit diagram notes and operating maintenance and engineering bulletins for telecommunication equipment. This work may interest, among others, ex-Service personnel who have been employed on similar work for electrical and radio equipment for the Forces. Permanent positions with good conditions and amenities, and five-day week. Write in first instance to Personnel Manager, Automatic Telephone & Electric Co. Ltd., Edge Lane, Liverpool, giving details of age and experience. 510

THE ENGLISH ELECTRIC Company Limited requires several well-qualified and experienced domestic appliance engineers for development work on new appliances at Liverpool. Permanent pensionable position will be offered to successful applicants. Please write, giving full details of qualifications and experience, and quoting ref. 452, to—Central Personnel Services, English Electric Co. Ltd., 24/30, Gillingham Street, London, S.W.1. 609

TRANSFORMER draughtsmen required, with some experience on units in the range 500 to 10,000 kVA. Salary according to qualifications. Apply—Technical Director, Bryce Electric Construction Co. Ltd., Kelvin Works, Hackbridge, Surrey. 640

TRANSFORMER test engineer with practical experience required. Good salary and prospects. Apply, stating age, experience and qualifications, to—Brentford Transformers Limited, Kidbrooke Park Road, London, S.E.3 (Tel. Lee Green 1006/8). 629

TRANSFORMERS & WELDERS Ltd., Sandown Road, Watford, have vacancies for fully experienced transformer draughtsmen. Specialised knowledge of arc furnace transformer design an advantage. Please give full details of experience, age and salary expected. 478

WANTED, capable representatives already calling on leading stores in Scotland, Yorkshire, South-East and West of England. To introduce new type of light fitting, which is already well established in London. 10% commission. Own car essential.—Sterling Light Co., 50, Ledbury Road, London, W.11. 610

WELL-known electrical manufacturers require experienced representatives for incandescent and fluorescent lamps and fittings in (a) Devon and Cornwall, (b) South Wales. Progressive post will go to ambitious man. Write—Box A.E.963, Central News Ltd., 17, Moorgate, London, E.C.2. 7497

WORKS chemist with full experience of all aspects of modern incandescent lamps technique wanted by large electric lamp manufacturers in London area.—Box 658.

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Dissatisfaction having so often been expressed that unsuccessful applicants are left in ignorance of the fact that the position applied for has been filled, may we suggest that Advertisers notify us to that effect when they have arrived at a decision? We will then insert a notice free of charge under this heading.

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ADVERTISER (42), H.N.C., present tech. rep. and eng. contractors, seeks change.—Box 8454.

ELECTRICAL and mechanical engineer, fully qualified, many years' experience in India, electrical construction, returning England in August, seeks post.—Box 8445.

ELECTRICAL engineer, 30, educated, well qualified, wide experience including electronics, seeks senior position development, technical sales, ability to converse high level, overseas considered, all offers invited.—Box 8439.

ENGINEER, good technical background, well-connected sales executive, switchgear, automatic controls, seeks position with scope, Southern England or Newcastle.—Box 8455.

ENGINEER, 26 years, Grad. I.E.E., H.N.C. Mech., D/O and sales experience with leading consultants and manufacturers, desires progressive post as sales representative in N.E. England.—Box 8418.

EXECUTIVE engineer, experienced production, sales, development, inspection, staff management. Would consider abroad.—Box 8432.

EXPERIENCED administrator electrical industry, technical and commercial, offers serve as assistant or consultant.—Box 534.

SALES engineer, 25 years' experience calling on electricity undertakings, desires change. First-class established contacts in several areas B.E.A. at Area and Sub-Area level. Car owner.—Box 8409.

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(1) 3,000-kW B.T.H. Turbo-Alternator Set, new 1918, working pressure 175/200 lb. p.s.i., temperature 550° F., 3,000 r.p.m. B.T.H. Alternator output 3,300 volts, 3-phase, 50 cycles, with switchgear, surface condenser, circulating air and condensate pumps, valves, gauges, piping, etc.

(2) 1,500-kW Turbo-Alternator by METROPOLITAN-VICKERS ELECTRICAL Co. Ltd., consisting of a Turbine-cum-Condenser designed to work at a steam pressure of 200 lb. per sq. inch, superheat 600° F., and to pass out up to a maximum of 25,000 lb. of steam per hour at a pressure of 30 lb. per sq. inch. The turbine is coupled through a single reduction gear to an Alternator wound for 3,300 volts, 3-phase, 50 periods, with switchgear. The set is complete with exciter, circulating pump and all fittings and mountings. The set is of the latest Turbo Bloc type with the turbine, condenser, alternator all on floor level, thereby doing away with the cost of expensive foundations. The whole set is in first-class condition. Particulars and prices, with drawings, on application.

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(4) 1,000-kW BELLISS & MORCOM/LANCASHIRE DYNAMO Turbo-Alternator Set, new 1924, working pressure 140 lb. p.s.i., temperature 500° F., 3,000 r.p.m. Alternator output 7,000 volts, 3-phase, 50 cycles; switchboard, BELLISS & MORCOM surface condenser, circulating air and condensate pumps, valves, gauges, piping, etc.

(5) 1,000-kW BELLISS & MORCOM/LANCASHIRE DYNAMO Turbo-Alternator Set, new 1925, working pressure 140 lb. p.s.i., 3,000 r.p.m. Alternator output 3,300 volts, 3-phase, 50 cycles, switchboard, complete with jet condenser, motor-driven circulating pumps, valves, gauges, piping, etc.

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(3) 6-h.p. LAURENCE SCOTT & ELECTROMOTORS Ltd., totally enclosed, ball-bearing Motor, 940 r.p.m., 400 volts, 3-phase.

(4) 5-h.p. ENGLISH ELECTRIC Motor, totally enclosed, 1,000 r.p.m., 440 volts, 3-phase.

(5) 2-h.p. LAURENCE SCOTT & ELECTROMOTORS Ltd., 940 r.p.m., 400 volts, 3-phase Motor, mounted on bedplate, coupled to reduction gear with final drive at 55 r.p.m.

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(3) 10-h.p. CROMPTON, screen protected, 480/550 v., 1,000 r.p.m.

(4) 5-h.p. SIEMENS, 220 volts, 1,200/1,800 r.p.m.

(5) 4-h.p. MET-VICK., 480/550 volts, 1,250 r.p.m., totally enclosed.

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Surplus Stocks of V.R.I. Cable up to 7/044.

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STEAM-driven Alternator Sets, suitable 150/160 lb. pressure, 3-phase, 50 cycles, each complete with exciter and starting equipment available.

POWETT LINDLEY Co. Ltd. Vertical Twin-cylinder Engine: G. & B. Alternator, 250 kW, 500/550 volts, 375 r.p.m.

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POWOTT LINDLEY Steam Generating Set, twin-cylinder high-speed engine, 160 lb. pressure, normal back pressure, direct coupled to E.C.C. Generator No. 15356, 6-pole compound wound, 220 kW, 220 volts D.C., 400 rev.: also spare armature requiring small amount of repairs.

Smaller Steam Generator Sets, Winches and other Machinery also available.

Inspection invited. Offers considered.

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140 h.p. Slipring Motor by LAURENCE SCOTT, 980/675 r.p.m., 415/3/50, with Starter.

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48-h.p. Squirrel Cage Motor by LANCASHIRE DYNAMO, 725 r.p.m., 400/3/50, with Starter.

70-h.p. D.C. Motor by BRUCE PEEBLES, 610 r.p.m., with Starter.

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ONE 350-kW, 300-r.p.m., 400-volt, 3-phase, 50-cycle revolving field Alternator with direct-coupled exciter; single-bearing machine, with half coupling for direct coupling only. Inspection invited.

One Motor Generator Set consisting of 120-h.p., 400/3/50-cycle slipring motor direct coupled on combination baseplate to a 1,100-amp., 20/60-volt, 960-r.p.m. generator, with direct-coupled exciter. Also including switchgear for incoming and outgoing sides.

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TRANSFORMERS
(Portable Oil-Cooled)

ONE 145-kVA HACKBRIDGE, No. 12278, 3-phase and neutral, 50 cycles, 12,000 volts primary, 440 volts, 190.5 amps. secondary (tubed type).

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One 25-kVA HACKBRIDGE, No. 1850, type ST.6B, primary volts 550, amps. 27/54/27, 50 cycles; secondary volts 110, amps. 227.

Also Transformer Tanks, 6′ & 5′ × 3′ × 3′ (Tubed type). All excellent condition. Inspection invited.

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(Telephone 657). 369

DIESEL ENGINES

1,250 b.h.p. vertical, 6-cylinder, solid injection, 2-cycle, single-acting, super scavenge Diesel Engine by SULZER, 420 r.p.m., complete with air starting equipment, water cooling tower and softening plant, exhaust system, fuel tanks, valves, piping, gauges, tools and spares.

Installed by Sulzer Bros. in 1948 (2 available).

B.C.S. (ENGINEERS & CONTRACTORS) LTD.
3, Castle Street, Cardiff
(Tel. 29246/7/8). 720c

BOILER FEED PUMPS

(1) 9,000-g.p.h. WEIR vertical, single-cylinder, double-acting Boiler Feed Pump, size 9¼″ × 12½″ × 24″, steam pressures up to 250 lb. p.s.i., delivery pressure up to 250 lb. p.s.i.

(2) 8,000-g.p.h. ditto, size 9″ × 12″ × 24″.

(3) 6,400-g.p.h. MATHER & PLATT Boiler Feed Pump, driven by 45-b.h.p. MATHER & PLATT Turbine, 250 lb. pressure, 5 lb. exhaust pressure; 3,000 r.p.m. Pump delivery pressure 250 lb. p.s.i. (2 available).

(4) 6,400-g.p.h. ditto Pump, driven by 45-b.h.p. LAURENCE SCOTT Motor, 400/3/50, 2,950 r.p.m., complete with BROOKHIRST Starter (2 available).

Centrifugal Pumps

(5) 14″ suction × 12″ delivery HARLAND single-stage Centrifugal Pump, direct coupled to 340-h.p. HARLAND S.C. Motor, 3,300/3/50, 1,475 r.p.m., with starter; capacity 3,000/3,500 g.p.m., 150′ head at 1,475 r.p.m. (2 available).

(6) 14″ × 12″ ditto Pump, direct coupled to 175-h.p. HARLAND Motor, 3,300/3/50; 980 r.p.m.; capacity 3,000/3,500 g.p.m., 75′ head at 980 r.p.m.

B.C.S. (ENGINEERS & CONTRACTORS) LTD.
3, Castle Street, Cardiff
(Tel. 29246/7/8). 7203

ELECTRIC MOTORS

THE LOWER THAMES LAND DEVELOPMENT & CONSTRUCTION COMPANY LTD. have for disposal the following motors. Offers to purchase should be made to the company, British Electricity House, Great Portland Street, London, W.1.

Quantity.	Size.	B.H.P.	Method of Starting.	Revs.	Slide Rails Fitted.
3	E.E.6 S.	7½	D.O.	715	No
2	E.E.7 S.	10	D.O.	720	No
1	E.F.5 W.*	15	S.R.	725	Yes
1	E.F.5 W.	20	S.R.	965	Yes
6	E.H.7 W.*	15	S.R.	575	Yes
2	G.A.4 S.	1	D.O.	930	No
1	G.A.5 S.	3	D.O.	1,430	No
5	G.C.6 S.	2	D.O.	710	No
7	G.D.6 S.	3	D.O.	715	No
3	G.D.8 S.	5	D.O.	715	No

All the above motors are UNUSED and of LAURENCE SCOTT manufacture, totally enclosed, fan cooled, with single-ended shafts and suitable for operation on a 3-phase, 50-cycle, 400-volt supply. All are to B.S.S. 168. Those marked * are slipring type, the remainder squirrel cage. Starters and switchgear not available. 611

TURBO-ALTERNATORS FOR SALE

UNUSED 4,500-kW Turbo Alternator Set by ALLIS CHALMERS, 3,300 volts, 3-phase, 50 cycles. Fully condensing. Steam pressure 400 p.s.i.

2,500-kW Steam Turbo Alternator Set by BELLISS & MORCOM, 3,300 volts, 3-phase, 50 cycles. Complete with surface condenser. Steam pressure 150 p.s.i. 1938.

1,875-kVA ENGLISH ELECTRIC Condensing Steam Turbo Alternator, 550/3/50. Steam 150 p.s.i.

1,000-kW Steam Turbo Alternator Set by BROWN BOVERI. Complete with surface Condenser and auxiliaries. Steam pressure 150 p.s.i. 1938.

938-kVA MET.-VICK. Condensing Steam Turbo Alternator Set, 550/3/50. Steam 150 p.s.i. With switchgear and all auxiliaries.

550-kW BELLISS & MORCOM Condensing Steam Turbo Alternator Set. 400/3/50. Steam 160/175 p.s.i. With Switchgear and all auxiliaries. 1937.

REED BROTHERS (ENGINEERING) LTD.
Replant Works, Cuba Street, Millwall, E.14
(Phone: East 4081)5). 663

BALL AND ROLLER BEARINGS

130 MJ.1″; 300 LJ.¾″; 40 LJ.¼″; 67 HJ.30; 67 HJ.45; 22 HJT. 40; 16 NMJ.¾″; 8 MRJ.35. Many other sizes in stock.

HAROLD POTTER & CO. LTD.
Canal Street, Nottingham (Tel. 44620). 630

UNUSUAL OPPORTUNITY!

WELL-known small type Electric Washing Machines, brand new, with maker's guarantee, decontrolled (half list price). Quantity ex stock to clear. Write—Box 2379, Frost-Smith Advg., 64, Finsbury Pavement, London, E.C.2. 612

SALES BY TENDER

Merseyside and North Wales Electricity Board, No. 2 Sub-Area

Surplus Meters

THE MERSEYSIDE AND NORTH WALES ELECTRICITY BOARD invites tenders for Surplus Meters. The meters, which are in good condition, can be inspected at the Electricity Works, Howley, Warrington, and Electricity House, Town Bridge, Northwich, on any week-day between the hours of 9 a.m. and 5 p.m.

Forms of tender can be obtained from me, and completed tenders must be sealed and endorsed "Tender for Surplus Meters," and delivered to Sandiway House, Near Northwich, Cheshire, no later than 12 o'clock noon on Monday, the 14th July, 1952.

S. C. HARLING,
Manager, No. 2 Sub-Area.

Sandiway House,
Nr. Northwich, Cheshire.
20th July, 1952. 666

ELECTRIC MOTORS FOR SALE

OWING to a bulk purchase we are able to offer the following 525/550-volt, 3-phase, 50-cycle Motors, all complete with starting gear, at very favourable prices.

3 at	175 h.p.	B.T.H., 488 revs., S.R.
2 at	125 h.p.	B.T.H., 585 revs., S.R.
	85 h.p.	E.C.C., 480 revs., S.R.
	50 h.p.	B.T.H., 485 revs., S.C.
	40 h.p.	B.T.H., 485 revs., S.C.
	25 h.p.	B.T.H., 484 revs., S.C.
10 at	15 h.p.	LAUR. SCOTT, 960 revs., S.C.
3 at	10 h.p.	B.T.H., 950 revs., S.C.

The above motors can be supplied reconditioned and guaranteed, or alternatively we will consider offers for them as they are, loaded our works.

THE ELECTROPLANT COMPANY
Palace of Engineering, Wembley, Middx.
(Phone: Wembley 6061). 659

DIESEL GENERATING SETS

COMPLETE contents of Power Station, comprising:—Two 1,250-b.h.p. vertical, 6-cylinder, solid injection, 2-cycle, single acting, super scavenge SULZER Diesel Engines by CAMMELL LAIRD, 428 r.p.m., each direct coupled to a brand new 1,060-kVA, 850-kW, 2-bearing Alternator by PELLIZZARI & FIGLI, wound for 440 volt/4-wire, or 3,300 volts, 3-phase, 50 cycles with overhung Exciter.

Complete with Switchgear, Air Starting Equipment, Exhaust Systems, Water Cooling Tower and Softening Plant, Fuel Storage Tanks, Instruments, Valves, Gauges, Piping, Tools and Spares. Engines installed by Sulzer Bros. in 1948; the Alternators brand new, delivery from makers in three months.

B.C.S. (ENGINEERS & CONTRACTORS) LTD.
3, Castle Street, Cardiff
(Tel. 29246/7/8). 7202

IMMEDIATELY AVAILABLE

400-kW DIESEL ALTERNATOR SET comprising 576-h.p. PETTER Superscavenge 6-cyl. Engine direct coupled BRUSH Alternator, output 400/3/50, speed 600 r.p.m. Complete with all auxiliary and ancillary equipment, comprising alternator control panel with A.V.R., HEENAN & FROUDE water cooler, air starting equipment, piping, tanks for fuel and lubricating oil, etc. All new 1948. Used two years only.

GEORGE COHEN, SONS & CO. LTD.
Wood Lane, London, W.12 388

DIESEL GENERATORS BY HOUCHIN

100-kVA G.M.C. Generating Plant now available for almost immediate delivery to the home market only. Incorporating the famous HLD Alternator.

Details and specification on request from the actual manufacturers:—

THE HOUCHIN ORGANIZATION
Garford Works, Garford Street, London, E.14
Tel.: East 4123 (5 lines).
Grams: "Garfodia, London." 232

WATER TUBE BOILERS

(1) 25,000 lb. per hour BABCOCK & WILCOX single-drum, land type Marine Water Tube Boiler, new 1925, 200 lb. working pressure, 570° F. temperature. Complete with superheater, GREEN'S economiser, forced draught fan, twin chain grate stokers, soot blowers, steelwork, valves, fittings, gauges, etc.

(2) 15,000 lb. per hour Boiler, as above, new 1931, complete with GREEN'S economiser, superheater, chain grate stoker, soot blowers, steelwork, valves, gauges, fittings, etc.

(3) 10,000 lb. per hour BABCOCK & WILCOX single-drum Water Tube Boiler, new 1930, 160 lb. working pressure, heating surface 2,255 sq. feet, complete with all fittings.

B.C.S. (ENGINEERS & CONTRACTORS) LTD.
3, Castle Street, Cardiff
(Tel. 29246/7/8). 7211

GENERATING SET FOR SALE

THE DOWSETT GROUP OF COMPANIES have the following plant available for sale:—

360-kW PETTER/BRUCE PEEBLES Generating Set, but without the Petters 6RA engine. The alternator, switchgear, panel board and all ancillary equipment are in perfect condition and offered at £4,000.

This generator is lying at Tallington, Stamford, Lincolnshire, and is offered subject to remaining unsold.

The figure given indicates the value we place on this item of plant, but we are prepared to give favourable consideration to any offer which may be submitted, and any further information which may be required can be obtained from:—

DOW-MAC (PLANT & TRANSPORT) LIMITED
Tallington, Stamford, Lincs
(Telephone: Peterborough 4501). 285

GENERATING PLANT FOR SALE

750-kVA Modern Steam Generating Plant. BELLISS & MORCOM Vertical Engine direct connected LAURENCE SCOTT Alternator, 440 volts, 3-phase, 50 cycles, speed 300 r.p.m., working pressure 120/150 lb. p.s.i., back pressure 2 p.s.i. Plant new 1936.

REED BROTHERS (ENGINEERING) LTD.
Replant Works, Cuba Street, Millwall, E.14
(Phone: East 4081). 665

STORAGE TANK

ONE Dished-end Tank, riveted construction, 23′ long, 3′ 6″ dia., approximate capacity 1,400 gallons.

B.C.S. (ENGINEERS & CONTRACTORS) LTD.
3, Castle Street, Cardiff
(Tel. 29246/7/8). 7210

VERTICAL BOILER

700 lb. per hour Vertical Crosstube Boiler, new 1935, 3′ 8″ dia. × 9′ high, 80 lb. p.s.i. working pressure. Complete with fittings and mountings, ROYLES feed regulator, WEIR feed pump, chimney, etc.

B.C.S. (ENGINEERS & CONTRACTORS) LTD.
3, Castle Street, Cardiff
(Tel. 29246/7/8). 7207

LANCASHIRE BOILERS

30′ × 8′ 6″ YATES & THOM Twin Flue Lancashire Boilers, 160 lb. p.s.i. working pressure, fitted with BENNIS Stokers, complete with feed pump, chimney, etc. Full particulars and copy of insurance reports from:—

B.C.S. (ENGINEERS & CONTRACTORS) LTD.
3, Castle Street, Cardiff
(Tel. 29246/7/8). 7205

VALVES

RECONDITIONED and tested Cast Steel and Cast Iron Valves, from 12″ to 24″, by DEWRANCE, HOPKINSON, GLENFIELD. Full list gladly sent on request.

B.C.S. (ENGINEERS & CONTRACTORS) LTD.
3, Castle Street, Cardiff
(Tel. 29246/7/8). 7213

PUMPS AND PUMPING SETS

BRAND New RYALAND Vertical Self-priming Pump, fitted with totally enclosed ½-h.p. Electric Motor, 230/1/50. Range 300 g.p.h. at 62-foot head. £20 to clear.—INDUSTRIAL & INTERNATIONAL AGENCIES LTD. 47, Victoria Street, London, S.W.1 (Abbey 3074/5). 660

A BABCOCK & Wilcox water-tube boiler will cut down your fuel costs; we can supply from stock. Two 50,000 lb. evap., 310 lb. w.p.; two 40,000 lb. evap., 200 lb. w.p.; two 25,000 lb. evap., 250 lb. w.p.; two 16,000 lb. evap., 190 lb. w.p.; also marine, Cornish, vertical, etc. We install complete, including brickwork.—Burford, Taylor & Co. Ltd., Boiler Specialists, Commercial Street, Middlesbrough (Tel. Middlesbrough 2622). 32

A.C. and D.C. house quarterly and prepayment meters. —Electric Meter Co., Castor Road, Brixham. 8401

A BARGAIN in electric motors can always be obtained from A. Cooksley & Co. Ltd., 21-35, Tabernacle St., London, E.C.2. Tel. Monarch 3357. Stocks at present comprise new squirrel cage motors, 1-25 h.p., also new and secondhand slipring motors, with starters, from 7½ b.h.p. to 30 b.h.p. 50

A.C. and D.C. house service meters, all sizes, quarterly and prepayment, reconditioned, guaranteed one yr. Repairs and recalibrations. — The Victa Electrical Co., 47, Battersea High St., S.W.11 (Tel. Battersea 0780). 138

A.C. and D.C. motors, all sizes, large stocks, fully guaranteed.—Milo Engineering Works, Milo Road, East Dulwich, S.E.22 (Forest Hill 2278-9). 102

A.C. and D.C. motors, generators, from stock.—Service Electric Co. Ltd., Honeypot Lane, Stanmore, Middx. (Edgware 8631-4). 91

ALTERNATORS for sale. More than 100 in stock from 40 kVA downwards. All voltages, one-, two- and three-phase with exciters, automatic voltage regulators and switchboards. Tropicalised without extra charge. Low prices. Guaranteed for twelve months.—Fyfe, Wilson & Co. Ltd., Bishop's Stortford. 682

BERYLLIUM copper rod, 3" dia., 1¼" dia., small quantity for sale.—Jones, 9, Grove Place, Port Talbot. 8423

BUILDERS' pole ladders from well-grown Norwegian spars now in production. Also all sizes steps, trestles, telescopic trestles, push-up and rope-operated extension ladders. Write, phone or call—Shaftesbury Ladders Ltd., 453, Katherine Road, London, E.7 (Phone, Grangewood 3363/4). 15

CABLE, 7.052 P.B.J., 100,000 yards for sale from stock at well below makers' price, on drums of 5,000 yards. —S. G. Young, 154/6, Blackfriars Road, London, S.E.1 (Waterloo 3131). 425

COPPER wire. Enamelled, synthetic, rayon, cotton, in most gauges. Available for immediate delivery.—Porchester Electrical, 15-16, Gerrard St., London W.1. 78

DIESEL electric plants, from 3-20-kVA output, with remote push-button control and automatic voltage control; prompt delivery; 3-kVA pattern with Petter engine, £295.—Ward, Lordscroft Works, Haverhill, Suffolk (Tel. 253). 167

DIESEL generating sets. English manufacture, direct current, all voltages, from 50 kW to 260 kW.—Britannia Manufacturing Co. Ltd., 22-26, Britannia Walk, London, N.1. 158

DIESEL generating sets. English manufacture, 3-phase, all sizes from 50 kW to 260 kW.—Britannia Manufacturing Co. Ltd., 22-26, Britannia Walk, London, N.1. 157

ELECTRIC generating plant, Gardner 6-h.p. oil engine, 150-volt Scott generator, direct drive, switchboard, 54 storage cells, powering 98-point lighting circuit. Sale due to installation of mains. Near Belfast.—Box 631.

ELECTRIC motors, dynamos, alternators and motor generator sets of all sizes. We hold one of the largest stocks in England. New and reconditioned with 12 months' guarantee.—Britannia Manufacturing Co. Ltd., Britannia Walk, London, N.1 (Clerkenwell 5512, 3 lines); also Works and Stores, Chobham, Surrey. 13

ELECTRIC motors, generators, control gear, transformers, A.C. and D.C., new and reconditioned; all covered with our usual 12 months' guarantee; large stocks available. — Electropower Co. Ltd., Kingsbury Works, Kingsbury Rd., London, N.W.9 (Colindale 4621-2). 42

ELECTRIC motors, generators, motor generator sets, transformers, switchgear, etc., large comprehensive stock, overhauled and guaranteed. Copy of our Register, "Electrical Surplus," containing thousands of items of electrical plant, sent on request. — R. F. Winder Ltd., Belgrave Electrical Works, Leeds, 2. 34

EXPORT enquiries welcomed for reconditioned quarterly and prepayment meters, immediate delivery.—Electric Meter Company, Castor Road, Brixham. 8399

FLUORESCENTS: Call at or write our new showrooms for a 24-page illustrated catalogue of industrial and decorative fittings at London's lowest prices. Large stocks of ballasts, chokes, chain, 2/5-ft. tubes, circular tubes, architectural lamps, D.C. resistances, switches and all fluorescent components.—Lumitron Ltd., 180, Shaftesbury Avenue, London, W.C.2 (Temple Bar 2900). 169

FOR disposal: 110-volt D.C. motors, all good condition, from fractional h.p. to 10 h.p. Prices on application to—Royal Standard Laundry, Bollo Lane, Chiswick, London, W.4. 406

FOR sale, H.T. feeder cubicle and transformer. English Electric 5.3-kV, T.P. type D.D. feeder cubicle, consisting of 2 link switches and two transformer switches. One 100-kVA, 3-phase, 50-cycle, 6.5-kV to 457-volt tapped Ferranti transformer. The above gear has, until recently, been connected to the London Electricity Board supply in the Northern Sub-Area and is in good working condition. Offers to—Carreras Ltd., Engineering Dept., Hampstead Road, London, N.W.1. 592

FOR sale. Large number of plating and anodising generators, also motor generator sets.—Fyfe, Wilson & Co. Ltd., Bishop's Stortford. 677

FOR sale. Quantity Lister diesel sets with new Freedom engines, 9/10 kVA, 380/440/3/50, 230/3/50, 230/1/50, 230/127/3/50, 110/1/50 and 110/3/50. Tropicalised if required. Exciters, A.V.R.'s and switchboards.—Fyfe, Wilson & Co. Ltd., Bishop's Stortford. 681

FOR sale. Three 2.2-kVA, 230/1/50 Coventry Victor diesel sets; also 5-kVA, 230/1/50 Lister diesel sets, as new. Can be seen on full load test.—Fyfe, Wilson & Co. Ltd., Bishop's Stortford. 679

FOR sale. Two 8-kW Lister diesel sets, each with nickel cadmium battery of 44 cells and capacity 380 amp.-hours, 10 hour rating, would separate batteries.—Fyfe, Wilson & Co. Ltd., Bishop's Stortford. 680

FOR sale. 750 yards 4/0 copper overhead wire in three coils, once used.—Fyfe, Wilson & Co. Ltd., Bishop's Stortford. 678

GENERATING sets. New Powerco diesel plants from £197 up. Complete and self-contained, A.C. or D.C., standard range from 1 to 50 kVA. Separate generators, alternators, etc., ex stock, all types. Lists free.—Powerco Ltd., Wandsworth Town Station, York Road, London, S.W.18 (Vandyke 5234). 153

GENERATING sets, petrol engine-driven alternators, 220/240 volts, single-phase and 3-phase.—Britannia Manufacturing Co. Ltd., 22-26, Britannia Walk, London, N.1. 160

GENERATING sets, petrol engine-driven dynamos, 110 volts and 220-240 volts, direct current.—Britannia Manufacturing Co. Ltd., 22-26, Britannia Walk, London, N.1. 159

H.F. alternators, unused, 1,500 cycles, 80 v., 25 amps., motor driven; also new drip-proof D.C. generators, 115 v., 7½ kW, 1,750 r.p.m., compound with switchboard; also rectifiers, output 36 v., 50 amps.—E. W. S. Co., 69, Church Rd., Moseley, Birmingham. 8420

HOUSE service meters, C. & H., Aron, E.A.C., 20-240 v. A.C., s.-ph., 50 c., 2½ amps., 7s. 6d. each, 1s. 6d. postage; 5 amps., 17s. 6d.—Universal Electrical, 217-221, City Road, London, E.C.1. 129

HOUSE service meters, from 5s., guaranteed two years. —Electric Meter Co., Castor Road, Brixham. 8400

IMMERSION heaters. Grubb 4 kW, tax free, 16" with thermostat, £5 17s. 9d.; also 11" to 42" available.—Horton Ltd., 53-55, Palmerston Rd., Sutton, Surrey. 8436

INSULATED tubing, 1⅛" o.d. × ⅞" i.d., 10,000 feet new stock available at 50% maker's current price.—Bristol Repetition Ltd., Feeder Road, Bristol, 2. 504

KLAXON horns, 110 volt. Large quantity available, two types.—Box 464.

LAMPS: Over 20,000, 25-150 w., 230/250, E.S. & B.C. lamps, from £2 per 100. List available. — J. S. Ramsbottom & Co. Ltd., Keighley. 43

LARGE quantity 12-volt Rotax starter motors.—Box 463.

MERCURY switches are made by Hall, Drysdale & Co. Ltd., of 58, Commerce Road, Wood Green, London, N.22 (Tel. Bow 7221). 182

METERS, A.C. and D.C., new and reconditioned, all types. Quarterly, single and three-phase, 3 and 4 wire, 2½ to 1,000 amps. Prepayment, single and double tariff, single, dual and triple coin, fixed and variable tariff, 2½ to 50 amps. M.D.I. billiards switches, rent collectors. Prices from 5s., carriage paid, guaranteed for ever. Immediate delivery, illustrated catalogue, from—The Electric Meter Company, Castor Road, Brixham. 8397

METERS, A.C./D.C., quarterly or slot.—Brent Electrical Co., 6 Holmdale Gardens, London N.W.4. 131

MK catalogue No. 3750, 5-amp. disc-operated watertight switches, brand new, 8s. each net, ex stock.—Ryness Ltd., 178, Stamford Hill, London, N.16. 8373

METROVICK/B.T.H. A.C. motors, ¼ h.p., 200/250 v., 50 c., 1-phase, 1,425 r.p.m., new, £6 14s.; ½ h.p., £7 19s. 3d.; ¾ h.p., £10 14s.; Capacitor start, ¾ h.p., £17 17s. 6d.; 1 h.p., £21 2s. 6d. Makers' list prices and trade terms. — Johnson Engineering, Official Metrovick Stockists, 319, Kennington Road, London, S.E.11 (Tel. Reliance 1412/3). 99

MOTOR converters and motor generators, unused, 110 v. and 220 v. D.C. to 250/1/50, 1 kVA, £29; 4 kVA, £49; 6 kW, £65; 110 v. and 220 v. D.C. to 25/35 v. D.C.; 1 kW, £19; lists free.—Powerco, Wandsworth Town Station, York Road, London, S.W.18 (Van. 5234). 149

MOTOR generator sets and converters, all sizes and voltages from ¼ kW up to 500 kW in stock.—Britannia Manufacturing Co. Ltd., 22-26, Britannia Walk, City Rd., London, N.1 (Tel. Clerkenwell 5512, 5513 & 5514). 28

MOTORS, D.C.; one 5 h.p.; one ¾ h.p.; two ½ h.p.; three 1/3 (one third) h.p. Also one thirty-horse-power generating plant consisting of a thoroughly sound vertical steam engine, working pressure 65-75 lbs./sq. inch, and 220-volt, 60-amp., D.C. dynamo. Offers to the Secretary, The Homes, South Darenth, Dartford, Kent (Farningham 2119). 667

MOTORS (unused), 1,450 r.p.m., 15 ½ h.p., £6/£7 each; 940 r.p.m., .33 h.p., £10; 2,900 r.p.m., ½ h.p., £6 10s. Motors (used), 1,440 r.p.m., ¾ h.p., £10; 1,425 r.p.m., ½ h.p., £13 10s. (flameproof); ¼ h.p., £3 10s.; ½ h.p., £7 10s.; 1/6 h.p., £4; 1,350 r.p.m., ½ h.p., £9; 660 r.p.m., ¾ h.p., £18; 1,725 r.p.m., ¼ h.p., £2 15s.; 2,900 r.p.m., ¼ h.p., £7 10s.—The D.C. Engineering Co. Ltd., Sherborne, Dorset (Tel.: 642). 668

NAMEPLATES, engraving, diesinking, stencils.—Stillwell & Sons Ltd., 153, Far Gosford St., Coventry. 14

ONE Crompton Parkinson type D261 D.C. generator, 75 kW, 480 volts, 285 r.p.m., with static balancer. Offers wanted. — Electrical Power Maintenance Service Ltd., Lower Essex Street, Birmingham, 5. 505

PETROL-electric lighting plant, Ford V.8 engine, water cooled, coupled to Met-Vick, 22.5-kVA generator, 400/230 volts, 3-phase, 32.5 amps., 50 cycles, 1,500 r.p.m., with exciter and control board, first-class condition; for prompt delivery. Send for list.—Leslie Dixon Co., 214, Queenstown Road, Battersea, London, S.W.8. 613

PHONE 98 Staines. Tanks: Unused 4,000 gallon enc. W.S. 15′ × 7′ × 7′; 200 cyl. enc. tanks up to 12,000 galls.; 26- and 5-kW diesel sets, 220 v. D.C.; 12.5-kVA petrol set, 120/240/1/60; 185-h.p. "Ruston" 5-cyl. diesel engine.—Harry H. Gardam & Co. Ltd., Staines. 60

PLATING dynamos and motor generator sets, various sizes from 500 amps. up to 2,000 amps., with A.C. or D.C. motors.—Britannia Manufacturing Co. Ltd., 22/26, Britannia Walk, London, N.1. 155

PORCELAIN cleats, 2 and 3 groove, up to 19/064.—Ryness Ltd., 178, Stamford Hill, London, N.16. 8374

PREPAYMENT meters, all types. — Electric Meter Company, Castor Road, Brixham. 8402

PREPAYMENT 1s. slot house service meters.—Universal Electrical, 217-221, City Rd., London, E.C.1. 56

PURLEY chokes and ballasts. Our so-w. tapped h.p.f. ballast with starter switch-holder incorporated is proving itself the most popular unit. Suitable for most fittings. 57s. 6d. each subject.—F. W. Blanshard Ltd. (Dept. ER), Purley, Surrey (Uplands 4818/9). 52

RESISTANCE wire (ferry) for sale, made by Henry Wiggins, .104″ diameter, resistance .081 to .083 ohms per yard, 700 lbs. available.—Box 632.

RESISTANCE wire: Nickel-chrome, Eureka, etc.; most gauges available for immediate delivery.—Porchester Electrical, 15-16, Gerrard Street, London, W.1 (Gerrard 7942). 81

ROTARY convertors in stock, all sizes, enquiries invited.—Universal Electrical, 221, City Road, London, E.C.1. 16

SLOT-meters, A.C. and D.C., all types, illustrated list. —Electric Meter Company, Castor Rd., Brixham. 8398

SLYDLOK fuses, all types, also English Electric H.R.C. fuses. D.P. and T.P. panel switches, ex stock.—Ryness Ltd., 178, Stamford Hill, London, N.16. 8375

STARTERS, slipring and D.C., hand-operated, all voltages up to 40 h.p., new. Short delivery. Also push-button and star-delta, 380/440/3/50, ex stock.—Electropower Co. Ltd., Kingsbury Works, Kingsbury Road, London, N.W.9 (Colindale 4621-2). 95

TELEPHONE cable, 7 pairs .035 VIR and braided. Quantity for sale at well below makers' price.—S. G. Young, 154/6, Blackfriars Road, London, S.E.1 (Waterloo 3131). 669

TRANSFORMERS: 1 kVA, 250/110/1/50, £9 10s.; 15 kVA, 230/115/1/50, £35; 5 kVA, 400/200/3/50, £29; 30 kVA, 400/200/3/50, £69; 50 kVA, 9,000/220/3/50, £95. Lists free.—Powerco Ltd., Wandsworth Town Station, York Road, London, S.W.18 (VAN. 5234). 152

SUDS pumps, various makes, 26 available. — Box 465.

TWO only, B.T.H. 100-h.p. slipring motors, 550 volts, 720 r.p.m., type IXT, ring oil bearings. Price £150 (one hundred and fifty pounds) each net. — Electrical Power Maintenance Service Ltd., Lower Essex Street, Birmingham, 5. 506

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Mr. Fred T. Jackson, O.B.E., Comp.I.E.E. (chairman and joint managing director), who presided, said :—

As you will have read my address circulated with the accounts, in which I stated that the Capital Issues Committee had refused our applications for obtaining additional capital, no doubt you will expect me to make some further comment on the position in which your company finds itself.

The position has not changed; and I consider the attitude of the Capital Issues Committee is quite inexplicable. Your company has been a successful one over the whole period of its existence, and it has shown increasing profits every year, which proves that the services we render to industry are of great value.

The Capital Issues Committee consists of five or six of the leading City men in the realms of finance and industry, and the only conclusion I can come to is that we have failed to put over to this committee the importance of the services we render to the commercial and industrial concerns in this country.

It is not a service that is easy to put over in words, but only by practical demonstration. And I feel that this is demonstrated by the fact that among our subscribers we embrace a large number of leading concerns in this country, and also public utilities and public services.

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All I can say at present is that we are not prepared to accept the negative attitude of the Capital Issues Committee, and we shall keep on keeping on until they are converted.

We are working strictly within the statement I made in my address issued with the accounts, and are limiting our services to firms engaged on defence work, export and public authorities, and, of course, carrying out our contractual obligations.

At the moment, I am not able to say more than this. But you will be advised in the press of any change for the better in the situation. The report was adopted. 642

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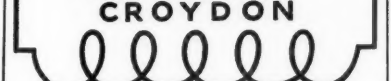

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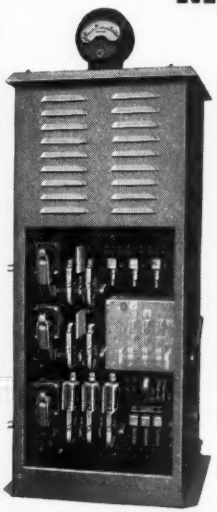

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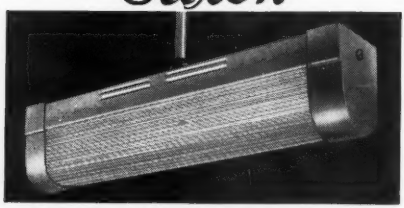

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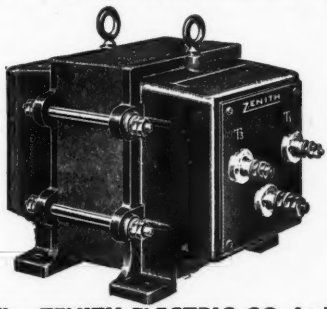

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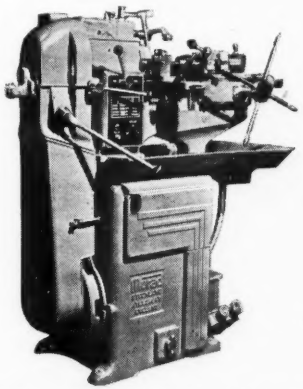

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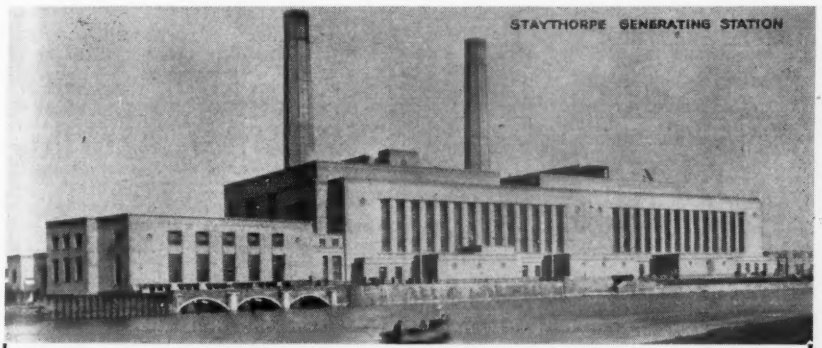

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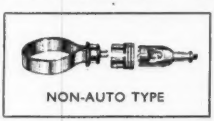

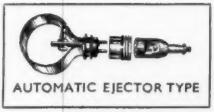

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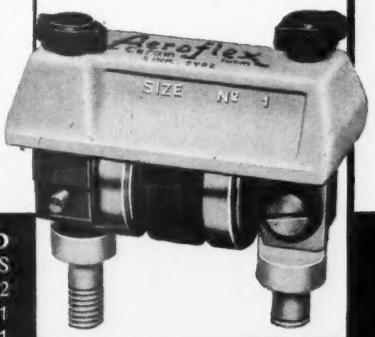

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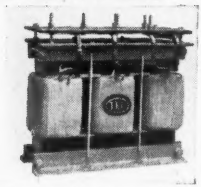

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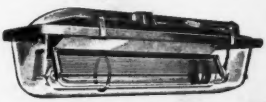

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